THE

AMERICAN REVIEW OF TUBERCULOSIS
ABSTRACTS OF TUBERCULOSIS

VOLUME XVIII NOVEMBER, 1928 ABST. No. 4

CONTENTS

	PAGES
General	81–83
Epidemiology (*Mortality, Incidence, Distribution*)	84–91
Programme and Campaign	91–102
Prevention: *BCG*	102–106
Aetiology	108–114
Tuberculosis in Infancy and Childhood	115–128
Pathology	129–144
a. Anatomical	129–140
b. Physiological	140–142
c. Chemical	142–144

Present Conception of Tuberculosis.—Although tuberculosis has long been recognized clinically, only recently has it been regarded as a disease that may become arrested. The development of this knowledge and of our present general conception of tuberculosis may well be divided into eras which correspond to the lives of outstanding men who contributed and materially established what is now our present conception of tuberculosis. For our present knowledge and system of physical examination of the chest we are most indebted to Auenbrugger and Laennec who were the first to establish systematic and accurate methods of pulmonary diagnosis. The former described percussion in 1761, and Laennec used auscultation as early as 1815. Klencke and Villemin we owe homage to most, for being the first to determine the infectious nature of tuberculosis. However, it must be remembered that in the earlier centuries Galen and other Greek physicians considered tuberculosis to be an infectious disease, but they did not prove it to be such. Klencke in 1843 was the first to transmit tuberculosis to an animal by inoculating it with material from a necrotic tubercle. Villemin later, in 1865, completed the experimental evidence begun by Klencke. By transmitting the disease from man to animal and further infecting a second animal from material obtained from the first or man-infected animal he proved beyond doubt the infectious nature of tuberculosis. This was almost twenty years before Baumgarten and Koch had seen the bacillus. We are responsible for the next era or period of progress to Baumgarten and Koch. The former is credited with having seen the bacillus unstained prior to Koch's epoch-making announcement. Following the work of Villemin and Koch's announcement there was an era of bacterial domination. The idea, held up until that time, that tuberculosis was inherited was now discarded. It has taken nearly half a century to give heredity its rightful place as an etiological factor. The inheritance of characteristics or qualities which permit disease in some, while in others the infection is held within bounds, is regarded now as a clinical fact

at least. Next came the tuberculin era, during which time interest in the disease was further aroused, and study and clinical observation became more intense and accurate. Koch obviously is the outstanding figure in this period also. It was he who first noted that, when a tuberculous animal was inoculated again with bacilli, it reacted differently from the way it did when inoculated for the first time. An inflammatory process appeared around the previously existing tubercles following a second inoculation. He regarded this phenomenon as a part of the mechanism of healing. This suggested the idea to Koch that there should be some specific product which would produce healing and immunization, just as would a limited number of living bacilli, without exposing the patient to a renewed infection. The next step forward in the advancement of knowledge of the disease was the discovery of the diagnostic value of tuberculin. With its use tuberculosis began to be diagnosed earlier, even before bacilli were found in the sputum. Pirquet and Römer are prominently identified with this period. When the former discovered the fact that individuals infected with tubercle have skin hypersensitiveness to tuberculin he established a method which gave us first undisputed evidence of how universally the human race is infected with tubercle. Mendel and Mantoux supplemented his work. The first concerted effort to treat tuberculosis in institutions was not until 1840, when Bodington of Warwickshire and later Brehmer of Germany in 1859, instituted this method of treatment. Dettweiler, a patient of Brehmer, and later his assistant, was the first to advocate long hours of reclining on couches as an important part of the treatment. This was the beginning of our present rest-cure. Trudeau established the first sanatorium in America in 1884, and thereby set an example which has been adhered to until the present time. The place of the sanatorium in the treatment of pulmonary tuberculosis is well recognized and cannot be overemphasized. At present tuberculosis is regarded as an infectious disease, mildly transmissible, the first infection usually being in cildhood. If this initial infection is not due to too great a number of bacilli, tubercle results, followed by a stimulation of the immunizing mechanism of the individual. Some of these cases result in local tubercle; others in clinical tuberculosis.—*A Survey of Important Factors Leading up to Our Present Conception of Tuberculosis, F. M. Pottenger, Med. J. & R., October 6, 1926, cxxiv, 385.—(H. McL. R.)*

So Called Minor Tuberculosis.—The evolution of the conceptions of pulmonary tuberculosis in the past may be summarized as follows: The Victorian conception: "A fatal disease; when recovery ensues, the diagnosis should be revised." The Edwardian conception: "A widespread disease as a pathological finding, but always dangerous, and often fatal, when causing symptoms." The Georgian conception: "A widespread disease, terminating usually in uneventful recovery among the highly resistant majority of the population, but dangerous to a minority with low resistance." By minor tuberculosis is meant that type which some speak of as latent tuberculosis and others speak of only as a tuberculous infection. "Minor tuberculosis" seems a better phrase, inasmuch as symptoms and possibly some signs are present. Minor tuberculosis, as manifested in the highly resistant majority, occurs sometime during the life of 40 per cent of human beings, and is characterized by mild symptoms, such as a slight cough, some wasting, perhaps lassitude or "run-down" feeling which have a tendency to clear up without sanatorium treatment Common-sense living, occasional short vacations, and home treatment are all that seems necessary for the recovery of the great majority of such cases. For practical purposes sputum-positive cases are not included in "minor tuberculosis." Four cases with a history suggestive of tuberculosis, mild symptoms, and at least very suspicious physical findings with follow-up records are submitted as type cases. All did well under home treatment, and some, from six to fourteen years after the diagnosis was made, remained in good health enjoying active lives. A tendency to diagnose minor tuberculosis as something else, and very ill pneumococcus-infected patients as tuberculosis, is pointed out.—*Minor Tuberculosis, E. Ward, Lancet, January 21, 1928, ccxiv, 125.—(H. McL. R.)*

Historical Note on Treatment of Pulmonary Tuberculosis.—The results obtained by chemotherapy and serotherapy in the treatment of tuberculosis have been very mediocre and incomplete. Far better results have been obtained with artificial pneumothorax, but this form of treatment is only applicable to a limited number of cases. Climatic treatment has been used empirically for a long time, and is available for by far the majority of sufferers of tuberculosis. Residence in the plains, mountains, at the seashore and in sanatoria is the most used form of therapy at the present time.

It is of interest to note that even in the time of Trajan, during the first century of the present era, many of our modern methods of treatment were in great vogue. In his letters to Paulinus, Pliny the younger speaks of the poor health of his young protege who had several attacks of blood-spitting during the recital of his verses. He made a long sojourn in Egypt, on the banks of the Nile, where it was warm and dry. He returned to his native city in apparently good health, but after a short time his cough returned and he had another attack of haemoptysis. He was removed to the mountains where he followed the milk cure.—*Note historique sur le traitement de la tuberculose pulmonaire, M. Michel, Prog. Méd., December 10, 1927, no. 51, 2031.*—(*U. E. Z.*)

Suspecting Tuberculosis.—We are only going to get at tuberculosis in its early stages and further diminish its mortality by teaching the public its striking warning signs and symptoms. Although the diagnosis of incipient tuberculosis is not inherently difficult, the fact remains that the medical profession fails to diagnose it and probably will continue to fail until our method of attack is changed. The entire subject of tuberculosis is given too scanty attention in our medical schools. These schools are more and more turning out teachers and investigators rather than the very necessary practitioners. The refusal of most general hospitals to admit tuberculosis in the wards is another drawback. As a result, nurses, internes and staff have no real opportunity for contact and study. Christian has recently affirmed his belief that all forms of tuberculosis should be admitted either into the general wards, or, better, a special ward. The average general practitioner is also too hurried and overworked, making often 20 to 30 calls a day and rushing through office hours. Failure to be frank with patients, born of a desire to avoid unpopularity, is also indicted. Instruction of the public should be done by the medical profession. The Boston Tuberculosis Association has recently been criticized on the ground that too large a proportion of its budget was devoted to running a preventorium. However, such an institution, properly managed, is an educational centre of the highest value. The Health Crusade in the Boston schools and informal talks to young men and women in factories, stores and elsewhere, are educational in purpose. A third important agency is, or should be, the state and local boards of health and education. What signs or symptoms should be especially emphasized? While blood-spitting, pleurisy and persistent cough should be prominently mentioned, the constitutional signs and symptoms should be stressed more than they are, especially chronic fatigue, undue fatigue, ease of tire. Almost always these precede the more outspoken manifestations, sometimes for long periods, and are sufficient reason for consulting a physician and being given a careful examination.—*Suspecting Tuberculosis, J. B. Hawes, 2nd, New England J. M., April 5, 1928, cxcviii, 336.*—(*A. P.*)

Tuberculosis and Prohibition of Lactation.—Prohibition of nursing may be pronounced for either one of two reasons: either in order to protect the infant against the tubercle bacilli which the mother may expectorate, or in order to save the mother the additional burden. Such measures or the separation immediately after delivery of the child from its tuberculous mother should be discussed and decided upon during pregnancy. If the mother has bacilliferous sputum, nursing is out of the question and separation should be insisted upon. In benign cases, and if the necessary intelligent coöperation can be obtained, it may be considered to feed the child milk pumped from the mothers breast. The possibility of infection through the milk is so rare as to be excluded for practical purposes. In the presence of a pulmonary lesion but with negative sputum it is safer to urge separation, at least for the first few weeks. Healed "apical catarrhs" are no contraindication for nursing. Careful observation is necessary in such cases in order not to overlook possible exacerbations. In all cases in which danger of infection does not exist, nursing should be started and continued as long as no ill effects on the mother are observed. In many doubtful cases, a proper decision can only be reached by coöperation of obstetrician, internist, and pediatrist. If Calmette's vaccination should prove successful the prophylactic measures in regard to the infant could not be relinquished, since infection is likely to take place before immunity can be established.—*Tuberkulose und Stillverbot, A. Reuss, Wien. klin. Wchnschr., March 22, 1928, xli, 422.*—(*M. P.*)

Research in Tuberculosis.—We have not advanced in tuberculosis beyond nature's cure in spite of all the funds and effort spent on its study. For all our vaunted organized attack for over a quarter of a century almost all we can offer is rest in bed to allow the body, if it can, to accomplish a cure. We have learned means of enhancing this, but still the mortality is such as to make us

pause. We have just passed through an early-diagnosis campaign. We use this word "early" far too carelessly, for many cases skilfully diagnosed at the earliest possible moment go on to death sometimes with great rapidity despite every care. Yet we go on assuring the lay mind that if he but come *early* his salvation is sure. From this thought we shall later reap a harvest of mistrust. The cry of the doomed consumptive comes from within our best managed institutions. Another group of facts has come forward within the last decade and caused us to reflect: *1*: The shocking rise in the mortality curve during the war period, following the long decline which is known to have preceded campaign efforts. *2*: The shift in the mortality rate for young girls to the left. *3*: The rise of tuberculosis in pigs and chickens. *4*: The decline of tuberculosis mortality in the colored race, although we can scarcely claim a beginning of control methods for them. Many of our present methods began in Massachusetts, including the first Board of Health and first State Sanatorium. The names of Bowditch, Derby, Sedgwick, McNutt, Smith, and others stand out in public-health history. The National Tuberculosis Association has recently contemplated the following plan of research: *1:* A chemical fractionation of a chosen tubercle bacillus strain on synthetic medium and a biological study of the influence of each fraction on the normal and tuberculous animal. *2:* A comparison of this base-line microörganism of all the different strains of tubercle or acid-fast bacilli. *3:* A study of the living chemistry of the body cells in which the bacillus grows. *4:* A study of the problems of light waves in connection with the biology of this great disease problem. The coöperation has been obtained of the U. S. Public Health Service, the Bureau of Animal Industry, the Rockefeller Institute, eight universities, and two large drug manufacturing concerns. The following states or cities have contributed gifts: Pennsylvania, Maryland, District of Columbia, Beaver County, Chicago, Philadelphia and the Rockefeller Institute. The guidance and help of the best research men in the United States has been obtained. To secure a sufficient quantity of tubercle bacilli the H. K. Mulford Company, and Parke, Davis and Company have been called into coöperation. The material goes to Yale and the University of Chicago for fractionation, thence to the Rockefeller Institute, Cornell Medical College and Vanderbilt University for biological study. It is planned to reconstruct the fundamental chemistry of these tubercle bacilli and host cells and finally to arrive at a means of control and cure.—*The Future Responsibility of Research in Tuberculosis, Meeting Massachusetts Tuberculosis League, Springfield, Mass., April 30, 1928, reported in New England J. M., June 14, 1928, cxcviii, 905.*—(*A. P.*)

Research in Tuberculosis.—Since its foundation in 1913 the Medical Research Council (England) has taken a special interest in the promotion of research in tuberculosis. The Council's work in tuberculosis is not isolated from other branches of medical research. The members of the tuberculosis committees are in close touch with other committees, such as the Bacteriological Committee; the Committee on Human Nutrition; the Committee on the Biological Actions of Light concerning artificial heliotherapy in tuberculosis, and other committees. The Council appreciates that the investigation of tuberculosis must be conducted along many paths. Some of the investigators of the Council devote their whole time to research in tuberculosis, while others spend only part time in university departments, sanatoria and elsewhere following some special line of investigation approved by the Council. The work of past investigators and questions and problems under consideration at present are mentioned. Several special reports on tuberculosis issued by the Medical Research Council are also submitted.—*The Research Work in Tuberculosis of the Medical Research Council, A. S. MacNalty, Brit. J. Tuberc., January, 1928, xxii, 16.*—(*H. McL. R.*)

Causes of Recent Decline of Tuberculosis Mortality.—*1: Summary of Questions and Theories Proposed: 1:* Is there really a decline in tuberculosis mortality? *2:* May it be due to chance variations? *3:* Or to cyclic changes in virulence or infectivity of the tubercle bacillus? *4:* Or to differences in resistance of the population? (a) by natural selection and elimination of the predisposed? (b) by hereditarily transmitted increase in resistance? (c) by greater frequency of individually acquired resistance (protective tuberculization in childhood)? *5:* Influence of improved living conditions and economic factors? (a) alimentation? (b) housing? (c) conditions and hours of industrial work? (d) stabilization of industrial population? *6:* Improved general health, due to (a) diminution of transmissible diseases? (b) diminution of alcoholism? (c) improved popular instruction and individual hygiene? *7:* Antituberculosis methods? (a) earlier diagnosis? (b) improved treatment? (c) prevention of massive infection by (1) hygienic supervision of milk? (2) prevention

of contact infection? This last may come about either by education of patients (especially at dispensaries) or by isolation of cases of open tuberculosis in sanatoria and hospitals; (d) antituberculosis measures directed by demonstrations (for instance, those conducted by the Metropolitan Life Insurance Company)? The task of determining these causes, granted the fact of the decline, is a difficult and complex one. Opinions expressed reflect the modes of thought of the medical body and its leaders and follow veritable fashions. A comparison of the changes in mortality in different countries is instructive, allowing some comprehension of relative values of different factors. *1: Is there a decline in tuberculosis mortality?* The answer is positively yes. It has been worldwide, with variations. It has amounted to 70 per cent in England and Wales since 1851, and since 1890 in Denmark. In the United States in the Registration Area the mortality has been cut in half since 1900. *2: May it be due to chance variations?* It has been too definite and marked and has continued from year to year in a regular way (with the exception of certain countries where it has increased). *3: May it be due to cyclic changes in virulence or infectivity of the agent?* The infectivity and virulence of human types of tubercle bacilli have been found remarkably constant (Royal Commission, 1911). The difficulties experienced by Calmette in obtaining an atoxic species, and of innumerable other workers, confirm this fact. Also, such a theory cannot explain the marked differences in tuberculosis mortality in neighboring countries or regions where there are all facilities for mingling of populations. *4: Differences in resistance among the population.* (a) *Natural selection:* This could scarcely account for the differences in mortality curve in such countries as England and France which have been equally exposed to the ravages of the disease for centuries. (b) Hereditarily transmitted increase in resistance has been invoked to account for the differences among different races of a mixed population, as in the United States of America. That such racial differences exist seems indubitable, but it is difficult to understand how these can be modified in the course of a few decades when tuberculization has existed for centuries. Experimentally, there is no definite evidence of increased resistance being transmitted, especially such as may result from acquired tuberculization, as has been suggested. (c) Greater frequency of individually acquired resistance seems to be almost a universally accepted fact, or theory, since Pirquet's work, and appears to be confirmed by comparison of morbidity and mortality rates in civilized and isolated countries (for instance, certain African tribes) previously not subjected to tuberculous contagion. Thus, for some, the appearance of clinical tuberculosis is due to the development of an early childhood infection, facilitated by diminished resistance; for others, to a massive reinfection. *5: Improved living and economic conditions:* Almost all students of the matter have been impressed by the importance of these. Increased wages lead to increased well-being of the population. This is especially true for the United States and England. That there is a correlation between poverty and tuberculosis is certain, at least among the tuberculized. But how much importance should be given this "standard of living" is a moot question. (a) *Alimentation:* This factor has been particularly stressed in England. The tuberculosis mortality which closely followed the "alimentary crisis" in central Europe and in less measure in Northern Europe has drawn attention to this factor. (b) *Housing:* There is more or less general agreement on the dangers of overpopulation of houses and deficient light and ventilation. (c) *Conditions and hours of industrial work:* The limitation of working hours, interdiction of childhood employment in industry, and limitation and supervision over that of women, all have had an indubitable effect, especially in the United States of America and in England. (d) *Stabilization of industrial population:* This has occurred comparatively recently, along with increased affluence of the rural population. The great migration of the rural population to the cities (especially in England) occurred during the last half of the 19th century, with the period of industrial expansion, and resulted in a high tuberculosis mortality in the cities, which with progressive acclimatization and later diminished cityward migration, has been reduced. *6: Improved general health of the population:* (a) *Diminution of transmissible diseases:* Among those we may note especially water and milk-borne diseases, such as typhoid and dysentery. (b) *Decrease in alcoholism:* This has occurred especially in England, France and the Scandinavian countries. (c) *Improved instruction:* Popular class instruction has doubtless resulted in improved individual health habits. *7: Direct antituberculosis methods:* (a) *Early diagnosis:* This has resulted in earlier treatment, arrest of disease manifestations and prolongation of life; indirectly in cutting down the amount of massive infection in families from undiagnosed cases. (b) *Active treatment:* This can hardly be considered much of a factor when

one follows up discharged cases and sees in how few the disease remains permanently arrested. Also, very few receive sanatorium treatment. The indirect (educational and isolational) effects of institutional treatment are much more important. (c) *Prevention of massive infection:* Since Calmette's studies of intestinal infection, a great effort has been made in the United States and parts of Canada to eliminate milk-borne infection, by obligatory pasteurization, elimination of positive tuberculin-reactors among cows, and sanitary inspection of herds. It is chiefly in the second period of childhood that the effects of these measures are seen. Prevention of contact infection is realized, first by *education*, chiefly in dispensaries and by visiting nurses, second by *isolation* of open cases in sanatoria and hospitals. Newsholme has apparently demonstrated a notable effect of this last measure in England, and most authors consider it most important of all. *Antituberculosis demonstrations:* Most impressive are the results obtained on a large scale by the Metropolitan Life Insurance Company of America, which carries on a hygienic campaign among millions of clients, among whom tuberculosis mortality has fallen faster than among the general population. The Milbank Fund, in New York, has attempted a still larger demonstration, along the lines of that at Framingham, in both urban and rural populations. *II. Statistics of Tuberculosis Mortality:* These include England, Scotland, Wales, the Low countries, Switzerland, Bavaria, France, Spain, Germany, and the cities of Amsterdam and Paris. Due to continual changes in terminology employed in death certification, comparisons are somewhat difficult. The following simplified classification is recommended for general adoption: *1:* Pulmonary tuberculosis (including laryngeal, pleural and acute miliary starting from a pulmonary focus). *2:* Cerebromeningeal tuberculosis (including intracranial localizations). *3:* Abdominal tuberculosis (including intestinal, peritoneal, and lymph nodes). *4:* Tuberculosis of other organs (especially bones, joints, and lymph nodes, and often due to the bovine bacillus). The decline in tuberculosis mortality has not been the same in all countries and the pulmonary form has diminished faster than the others. The period of maximum decline occurred in the decade 1911–1921. The regular character of the decline is striking. In England it has been almost precipitous. For the sexes, the decline has been alike for meningeal and abdominal tuberculosis, but not so for pulmonary tuberculosis. In the Low Countries the masculine mortality is 13 per cent below the feminine, except in Amsterdam; in England and Wales the reverse is true, the feminine mortality being about 20 per cent lower. In Scotland there is little difference. General facts to be noted are as follows: *1:* An important drop in early infantile mortality. *2:* A slight diminution between 5 and 14 years. *3:* An appreciable decline for early adult ages. *4:* A flattening of the adult curve (25 to 60 years). *5:* Retardation of the age of maximum mortality. This now occurs between 30 and 60 years. *6:* No diminution in the mortality figures for advanced ages. *III. Conclusions and suggestions:* Statistics from various countries and cities establish the fact of a decline of tuberculosis mortality. A comparative study of the records for various parts of the world is desirable to aid in establishing the causes of this decline. For this greater uniformity in nomenclature is desirable. The following points are particularly deserving of special study: *1:* A comparison of tuberculosis mortality and general mortality. This should be made according to age and sex for the different countries and periods, to determine whether covariation exists, and how close it is. This may be expressed mathematically. *2:* The specific action of alimentation on tuberculosis could be studied by comparing in different countries and periods the per capita consumption of essential foods, and noting the covariation with tuberculosis mortality. *3:* The relation of tuberculosis mortality during both periods of childhood to consumption and sanitary production of milk. A comparison should be made of (a) countries consuming no milk (Japan, Dalmatia); (b) countries consuming almost entirely boiled milk (France); (c) those using milk neither boiled nor supervised; (d) countries with effective sanitary supervision (tuberculin-testing and pasteurization,—Denmark and certain large American and Canadian cities). *4:* The influence of industrial work and urban life. For this purpose, the proportion of the population and of each sex employed in industry would have to be compared with the tuberculosis mortality for the same, and subdivided according to age and type of industry. The figures prior to the industrial era should also be considered. *5:* The relative importance of antituberculosis measures of all kinds, especially (a) dispensaries; (b) hospitals; (c) sanatoria; (d) auxiliary services,—social service, visiting nursing, preventoria, open-air schools, camps, hygienic propaganda. A study of the cost of such service should also be made.—*Rapport préliminaire sur les causes du récent déclin*

de la mortalité tuberculeuse, Y. M. Biraud, Rev. Belge d. l. Tuberc., January, 1926, xvii, 20.—(*A. P.*)

Decline of Tuberculosis Mortality.—Graphs are given to show the marked decline in the mortality from tuberculosis in Scotland from 1871 up to the present time. Comparing, in the case of England, the death-rate of each of the years 1881, 1891, 1901, 1911, and 1921, with that of ten years before, the 1881 death-rate in England shows a drop of 14 per cent, the 1891 death-rate a drop of 15 per cent, the 1901 death-rate a drop of 19 per cent, the 1911 death-rate a drop of 21 per cent, and the 1921 death-rate a drop of 20 per cent. The corresponding figures for Scotland are: 17 per cent, 21 per cent, 9 per cent, 21 per cent, and 31 per cent. From 1911–1921 the drop in the total tuberculosis death-rate in Scotland amounted to 31 per cent; and the drop in the pulmonary tuberculosis death-rate to 27 per cent, as compared to a drop of 7 per cent in the death-rate from all diseases. Facts relating to the decline in the tuberculosis mortality are the general education of the people in the past fifty years, better housing and working conditions, the associated rise of the standard of living, better wages, and the regulation of working hours, with greater facilities for regulated rest and open air activity.—*The Causes of the Decline in Tuberculosis Mortality, R. Philip, Brit., M. J., April 28, 1928, no. 3512, 701.*—(*W. I. W.*)

Tuberculosis among Young Women.—During 1926 in New York City 257 girls as compared with 139 boys, between the ages of 15 and 20, died from all forms of tuberculosis. Between the ages of 20 and 25, 369 women and 293 men died. In Baltimore the tuberculosis death-rate between 1910 and 1926 was 145 per 100,000 for females between the ages of 15 and 19, and 115 for males, while between the ages 20 and 24 the rates were 235 and 180. During recent years the average annual decline of the male death-rate has been much more pronounced than the decrease in the female death-rate. These comparative reports are striking, in view of the fact that the general morbidity and mortality of tuberculosis have been decreased by at least 50 per cent in the last 35 years. Among factors responsible for this increased mortality among young women may be mentioned the flimsy modern dress, with excessive exposure of shoulders and arms resulting in a predisposition to catarrhal or influenzal infections, thus preparing the field for tuberculosis. There is also the desire of many to have a slender figure, resulting, especially among office and factory workers, in actual undernourishment from hasty and inadequate meals at midday, which are not made up by a substantial breakfast or dinner. Unhygienic environment among office and factory employees, such as overheated dry workrooms and dusty atmosphere, is also responsible for much respiratory infection. A more remote factor is the lack of sanatorium facilities for the adolescent, as well as the almost total absence of infantoria. An annual physical examination of all the members of the family should become an indispensable custom. Between the ages of 15 and 30 there should be a careful semiannual examination. Among girls in high-schools and colleges there is very often a need for reform in the direction of too extensive curricula.—*Tuberculosis among Young Women, S. A. Knopf, J. Am. M. Ass., February 18, 1928, xc, 532.*—(*G. L. L.*)

Pulmonary Tuberculosis among Arabs.—The more extensive utilization of North African natives in the French army increases the importance of familiarity with their diseases, and pulmonary tuberculosis is especially deserving of study. The observations cited are personal, derived from hospital and autopsy studies in the Province of Oran. All possible means of investigation were employed, but tissue studies and radiography were prevented by the distance from the large centres. *Frequency:* Tuberculosis is common among the Arabs, more often lymphatic, osteoarticular or cutaneous than pulmonary. The Arabs react frequently but variably to tuberculin, this depending to a large extent on their degree of contact with Europeans. In the coastal town of Arzen 30 per cent of children from 2 to 5 give a positive cutireaction, 70 per cent of adolescents, and 94 per cent of adults. Among nomadic Arabs of the South of El Aricha, who work in the Tell during the harvest, 20 per cent of children and 45 per cent of adults reacted positively. Among the truly pastoral Arabs in a commune on the Moroccan border, all but 3 of 108 tested reacted negatively, and these later developed progressive acute tuberculosis. Outside of the cities tuberculosis among the Arabs is especially cutaneous, lymphatic or osteoarticular. In the military contingents the Arabs from the desert outnumber those from cities 5 to 1. Among the Arabs sent to the diagnostic clinics 5 per cent from the cities showed demonstrable tuberculous involvements as opposed to 0.28 per cent from the deserts. However, it is especially the manifestations which develop in the latter that are of interest, and 14 very complete case reports are cited.

Clinical Forms: I: Tracheobronchial Adenopathy: This was almost uniformly remarked, sometimes associated with more or less extensive mediastinitis. Demonstrable physical signs were almost uniformly noted, such as superior paravertebral dulness, paravertebral tubular breathing with egophony, whispered pectoriloquy, D'Espine's sign, and striking transthoracic transmission of sound. Signs and symptoms of mediastinal compression may be added, such as pertussoid cough, dyspnoea, collateral thoracic venous circulation, distention of the jugular veins, due to obstruction of circulation in the territory drained by the superior vena cava. In the Arab natives these lymphatic lesions accompany a more massive bronchopleuropulmonary involvement. At autopsy the tracheobronchial, intertracheobronchial and peribronchial lymph nodes are not localized to the mediastinum; most often they extend from the hilum into the pulmonary parenchyma, always in relation to a *chancre of inoculation*, generally active. Sometimes the hilar glands are enormous, inflamed, and surrounded by a more or less intense mediastinal reaction with caseified zones. These gangliopulmonary lesions are the mark of a more or less recent first infection but not of a reinfection. *II: Bacillary Bronchitis:* Before twenty years of age this is rarely seen, but between twenty and fifty it is common, especially between thirty-five and forty. The following diagnostic criteria are indispensable: *1:* Finding of tubercle bacilli in the sputum. *2:* Positive animal inoculation from the sputum. *3:* Positive tuberculin cutireaction after failure of intensive antisyphilitic treatment, supplemented by large doses of potassium iodide, or elimination of the ordinary forms of bronchitis. Syphilis and tuberculosis as etiological factors may, of course, coëxist. The following forms are recognized: *A: Stationary:* Occurring in chronic coughers and spitters, with occasional paroxysmal exacerbations favored by climatic changes; tubercle bacilli are often demonstrable and the tuberculin reaction is strongly positive; there are commonly signs of localized emphysema and of more or less well marked hilar changes. *B: Evolutive:* More or less discrete bronchitic signs, developing rapidly, added to those of corticopleuritis and hilar involvement. There is also a bronchopneumonic form, with rapid generalization. This latter is more common among recent recruits, the chronic form among the older laborers. *III: Pleural Reactions:* Pleural lesions are commonly encountered, most often associated with pulmonary lesions, especially bronchopneumonic. While among Europeans isolated serofibrinous pleurisy is frequent, in the native Arab it is rare, and the dry forms preponderate. In the army workers, between 20 and 40, usually after a premonitory attack of bronchitis with hilar adenopathy, slight dulness appears at the bases or about the incisures, with diminished fremitus. A febrile temperature persists for a greater or lesser time, then the signs of a dense pachypleuritis appear, and exploration is negative. Cure by pleural cicatrization, although possible, is rare; more often there occurs a subsequent bronchopneumonic or miliary evolution. At autopsy only a small quantity of fluid, if any, is found. Caseous and conglomerate foci are formed, with oedematous congestion of the parenchyma. *IV: Bronchopneumonic Forms:* These are common, progressing rapidly, analogous to what Hutinel and Granchér have termed "phthisis which burns the storehouses." The lesions may be lobular or more massive; they occur either in individuals who were free from any previous manifestations, or as terminal events in the course of a lymphatic or osteoarticular tuberculosis. Clinically there is a sudden or rapidly progressive impairment of health. On first examination there are few signs except of hilar adenopathy and fever is slight. Eight or ten days later fine congestive râles are heard either at the apices, the incisures, or some other place. After this the auscultatory signs progress rapidly, râles especially becoming larger and more numerous. The sputum now becomes abundant and bacilliferous. Vocal fremitus may be either increased or diminished. There is always dulness. Sometimes the lesions are unilateral, more often bilateral, but predominate in one lung. Death may occur suddenly from oedematous congestion of the lungs, a hectic fever appearing a few weeks before death. Before it occurs there is profound cachexia, often associated with severe gastrointestinal symptoms. At autopsy there is always a considerable hilar adenopathy, extending to the intrapulmonary peribronchial glands. The pulmonary lesions are often generalized but sometimes involve only one lung, the other showing oedematous congestion. Pneumonic, caseous and cavitated areas may be encountered. Pneumonic infiltration may dominate the picture, bordered by acute emphysematous zones. Sometimes a *chancre of inoculation* can be discerned, usually near the right base. The pleura is generally adherent and thick, showing areas of caseation but little or no fluid. *V: Pneumonic Forms:* These are always fatal. They occur in new subjects from the South who have come to the coastal towns to live and sleep in indescribable

promiscuity, subject to massive bacillary contamination. There are two types of picture: *1:* Onset is sudden, with pain in the side, fever and cough. The pulse is rapid, the arterial tension low. Death usually occurs about the fifteenth or sixteenth day, with hyperthermia and marked cachexia preceding it. Autopsy shows a pneumonic mass like a piece of cheese, occupying a lobe or part of a lobe, with tracheobronchial adenopathy. *2:* A dyspnoeic, hypothermic patient is brought to the hospital with thready pulse and feeble heart action. One lung shows a woody dulness, with absent breath-sounds and fremitus. Repeated exploratory punctures are negative. Death occurs in a few hours. Further investigation reveals that for some weeks the patient felt fatigued and for some days had difficulty in breathing. Autopsy shows a massive pneumonia, the lung appearing like Roquefort cheese. There are also *transitory pneumonic reactions*, temporarily favorable as to prognosis. The patient is a young subject, from 18 to 25 years old. There is a prodromal period of wasting and fatiguability, then abrupt onset of pain in the side, often supraclavicular, and intense dyspnoea and high fever. At an apex there are signs of frank pneumonia (upper lobe) with slightly diminished respiration elsewhere and bronchial breathing over the hilum. The sputum contains neither tubercle bacilli nor pneumococci; the cutireaction to tuberculin is positive. After a few days signs of a pleural effusion appear. Some fluid is withdrawn but less than the expected amount. It is haemorrhagic and tuberculizes a guinea pig on injection. Even after its withdrawal there are complete dulness and absolute silence. The symptoms then gradually diminish and the signs disappear except for those over the hilum. The patient is then generally lost sight of. It is suspected that a later evolution of disease often occurs. *VI: Miliary Forms:* This diagnosis can only be suspected during life, being confirmed only at autopsy. There are pleural, pulmonary and generalized forms. *1: Pulmonary Forms:* Their evolution is very rapid, appearing in virgin soil subjected to massive contamination. The onset is characterized by a feeling of fatiguability, then extreme fatigue, rapid pulse and fever, with lowered arterial tension and accelerated respiration, then dyspnoea and pain in the side. Later there is hyperthermia, terrible dyspnoea and progressive suffocation, death occurring after about five days, with no definite physical signs appearing in the chest. Autopsy shows disseminated granulations in the lungs, a little yellowish fluid in the pleura, a marked tracheobronchial adenopathy and only congestive lesions elsewhere, with livid surprarenals. The exposure to infection is found to have occurred a month to six weeks before, and the site of it is discernible. *2: Generalized Forms:* The onset is typhoidal, in a young subject. The temperature oscillates more than is usual in typhoid fever. Blood culture and serum reactions are negative. Tuberculin cutireaction is positive but weak. Abdominal distention is present and there is a mediastinal syndrome with dyspnoea. The course is four to five weeks. Autopsy shows disseminated lesions and adenopathy. *VII: Combined or Associated Forms.*—In these a bacillary septicaemia probably occurs in patients with old lymphatic or osteoarticular lesions, previously in good condition. *Conclusions:* The clinical forms of pulmonary tuberculosis in the Arabs are quite special, as they are not, especially those of the plains, entirely accustomed to the tubercle bacillus. *1:* Gangliopulmonary forms predominate, with successive or simultaneous involvement of bronchi, pleura and parenchyma, as well as mediastinal and intrapulmonary lymph nodes. The pleuritic reactions are generally dry, resulting in adhesions. In certain longer-exposed persons a chronic tuberculous bronchitis occurs. *2:* Pneumonic and miliary forms are next in frequency. *3:* The clinical manifestations are diverse, but haemoptyses are exceptional. The mode of reaction of the Arab seems midway between that of the negro and the white European. The following measures are recommended: *1:* Detection of those with chronic tuberculous bronchitis, who are a menace to the recently incorporated. *2:* Selection of contingents for incorporation with particular view to tuberculosis. The Arabs from the desert must not be mixed with those from the towns or with European contingents until the latter have been thoroughly examined. Fifteen very complete case histories are included in this article.—*De certaines formes de la tuberculose pleuro-pulmonaire chez les Arabes, G. Ryckebusch, Rev. d. l. Tuberculose, August, 1927, viii, 530.*—*(A. P.)*

Roentgenographic Chest Survey of Hawaiian Soldiers.—This paper is based on the incidence of pulmonary tuberculosis among the troops in the Hawaiian Department for the years 1923, 1924 and 1925. Within three years 68 cases of pulmonary tuberculosis have been returned to the mainland. Of these, 19 cases, or 28 per cent, had had less than one year's service, and 49, or 80 per cent, were first-enlistment men with less than three years service.

Of the 49 cases discovered during their first enlistment 42, or 86 per cent, had involvement of more than one lobe of the lungs, and 88 per cent had tubercle bacilli in the sputum. Ninety per cent of these cases could have been discovered at enlistment by a roentgenological chest survey.—*Advantages of a Roentgenological Chest Survey Applied to Recruits and Overseas Replacements of the United States Army, C. L. Maxwell, Am. J. Roentgen. & Rad. Ther., December, 1927, xviii, 562.*—(*W. I. W*)

Tuberculosis Morbidity among Jews.—Under like circumstances the tuberculosis mortality among the Jews is less than the general mortality. Unfavorable environment occasions among the Jews, like among all other people, increased tuberculosis morbidity and mortality. The basis for this protection of the Jews is hereditary. Of further significance is the better knowledge of the danger of the disease among the Jews, and a consequent greater caution exercised.—*Zur Morbidität der Juden: Die Tuberkulose, M. J. Gutmann, Beitr. z. Klin. d. Tuberk., 1927, lxiv, 106.*—(*H. J. C.*)

Tuberculosis Mortality in Ukraine.—The tuberculosis mortality in Ukrainia is higher than in other states and countries. Among 36 cities the figures varied from 12.7 to 40.5 deaths per 10,000 residents. The tuberculosis mortality for the years 1923 and 1924 approximated those of Prussia in the years 1896 to 1900. In childhood both sexes were about equally affected. During puberty the female mortality predominated, while during the working ages the tuberculosis mortality of the male was about double that of the female.—*Die Tuberkulosesterblichkeit in den Städten der Ukraine in den Jahren 1923 und 1924, N. Morosowsky, Ztschr. f. Tuberk., 1927, xlvii, 316.*—(*H. J. C.*)

Epidemiology of Tuberculosis.—The remains of an earlier tuberculous infection was found in 85 per cent of adults carefully examined in Amsterdam. This percentage was obtained even at the beginning of adult life. In addition, it was possible in 85 per cent of the adults to find the probable site of the tuberculous primary complex. In Amsterdam and Edinburgh primary intestinal tuberculosis was more frequent in young than in older adults. This difference was not so definite in Dresden; on the other hand, primary intestinal tuberculosis was very rare in infants in Amsterdam. In somewhat older children primary intestinal tuberculosis was fairly frequent in Amsterdam and Dresden, very frequent in Edinburgh, and rare in Vienna. With regard to the later development of pulmonary tuberculosis it was of very little significance in the adult where the tuberculous primary focus happened to be. Where primary intestinal tuberculosis was frequent this was attributable to bovine infection, and this form is more frequent as a fatal cause of tuberculous peritonitis in children. Enterogenic bovine infection is less serious than is aerogenic human infection. The majority of cases of pulmonary tuberculosis of the adult are due to exogenous reinfection.—*Über die Epidemiologie der Tuberkulose, R. Korteweg, Zeitschr. f. Tuberk., 1927 xlix, 176.*—(*H. J. C.*)

Experimental Epidemiology of Tuberculosis.—Spontaneous tuberculosis in rabbits or guinea pigs in laboratories where tubercle bacilli are constantly used for experimental purposes has been noted. This may be due either to naturally acquired infection or, when nontuberculous material has been injected into the animal, to wound contamination. The discovery of tubercle bacilli in the lesion at the site of inoculation indicates that the infection has entered through the wound. Experiments were made under controlled conditions to determine the frequency of the occurrence of spontaneous tuberculosis in guinea pigs exposed to tuberculous guinea pigs and the factors in its spread. The effects of varying degrees of exposure and of crowding were noted and the pathogenesis and pathology of the disease acquired by direct exposure to tuberculous animals with "closed" and "open" lesions were studied. The tests were carried out in a separate room in a separate building away from all possible sources of outside contamination. Normal guinea pigs were obtained which had never been exposed to tuberculosis. The diagnosis of every case of spontaneous tuberculosis was confirmed by the finding of acid-fast bacilli in smears from the organs involved. Careful precautions were taken with the diet and the attendant was not permitted to handle animals in the general room and workers from this room were excluded. About 460 guinea pigs were kept under observation. In the first experiment normal animals were exposed to cage mates infected intraperitoneally with human tubercle bacilli. The number of normal and infected animals was kept constant by continual replacement as deaths occurred. All animals were killed at the end of seven and one-half months. The two end cages contained the normal control groups and there was no instance of spontaneous infection in these cages. The three test cages contained 12 guinea

pigs each. In the one where there were 3 infected guinea pigs constantly present there was one instance of spontaneous tuberculosis; in the cage with half the number infected there was no spontaneous disease, although only three of the normal animals survived the entire period, and in the cage containing 9 infected animals (3 normals) two were found to have spontaneous tuberculosis at autopsy. Of a total of 13 normal animals which survived the entire period of the experiment, 22 per cent acquired tuberculosis. The portal of entry in all these instances was the intestinal tract and the mesenteric lymph nodes. The greatest incidence occurred in the cage where the intensity of the exposure was greatest. The source of infection in this experiment was probably through fecal contamination of food as infected guinea pigs eject viable tubercle bacilli in their feces during the last few weeks of their lives. The second experiment was similar to the first, except that the tuberculous pigs were infected subcutaneously in a dosage sufficient to cause local abscess-formation in many instances. In contrast to the first experiment the incidence of spontaneous tuberculosis was found to be somewhat higher. The tendency of guinea pigs to lick the open ulceration of their cage mates is, of course, an obvious means of transmission of the infection. It is noteworthy that infection *via* the intestinal tract with involvement of the mesenteric lymph nodes not infrequently is accompanied by massive infection of the submental and cervical lymph nodes. In the final experiment the effect of crowding on the incidence of spontaneous disease was studied. For the source of infection animals injected intraperitoneally were used. One of the cages contained nearly three times as many pigs as was usually allotted to the cage (30 as compared to 12). The result of this experiment was inconclusive as the greatest incidence of spontaneous infection did not occur in the most crowded cages. At least one instance of possible bronchogenic infection occurred in the experiment. These experiments show that spontaneous tuberculosis in guinea pigs is a readily contracted disease. Guinea pigs kept in separate cages in a room with tuberculous animals for a period of more than three months should not be used for experimental purposes, for the author reports two instances of spontaneous tuberculosis among known healthy guinea pigs when the cage containing them was placed among cages containing tuberculous rabbits. The portal of entry in both instances was the respiratory tract. *Conclusions: 1:* Normal guinea pigs exposed to tuberculous cage mates, infected intraperitoneally and with no cutaneous ulceration, readily contract spontaneous tuberculosis. *2:* The incidence of the spontaneous disease increases with the intensity and duration of exposure. *3:* Spontaneous tuberculosis thus acquired has with few exceptions the character of an infection which has entered by way of the digestive tract, disease of mesenteric and cervical lymph nodes being conspicuous. *4:* Guinea pigs exposed to tuberculous animals in the same room, but not in the same cage, may acquire tuberculosis which has the character of a bronchogenic infection associated with lesions of the lungs and tracheo-bronchial lymph nodes.—*Experimental Epidemiology of Tuberculosis, D. Perla, J. Exper. Med., February 1, 1927, xiv, 209.*—(*J. S. W.*)

Lessons of Antituberculosis Campaign.—The first accomplishment of the *Ligue Nationale* may be said to be the obligatory declaration of tuberculosis, which automatically led to measures of disinfection of sputum, linen, wearing apparel. Then came the emphasis on building up resistance against the germs, and improvement of collective economic and social conditions. The possibility of cure was also emphasized as it was necessary to inspire hope. Although tuberculin and other "specific" measures had failed, excellent results were being obtained from a methodical fresh air regimen applied in special institutions. The original therapeutic results obtained by the German pioneers were followed in Belgium, although France long remained skeptical, and evinced a preference for domiciliary hygienic-dietetic treatment under surveillance, as suggested by Calmette. In Belgium the powerful workmen's mutual societies were potent factors in carrying on propaganda for establishments. About 1900, one after another, the Belgian provinces organized public offices for bacteriological diagnosis, and soon afterward the *Oeuvre des tuberculeux* was founded at Liege, a medicosocial organization having as its prime purpose the systematic detection of curable cases. For these it was found necessary to impose institutional hygiene and discipline. An investigation of workmen's living conditions, lodgings, dwellings, food and working hours followed, with legislative recommendations. The *Société de médecine publique*, under Dewez's influence soon recognized that a newer and larger field lay ahead and organized the *Ligue Nationale Belge contre la Tuberculose.* All of its projects, before being put into effect, were subjected to discussions, polemics, and, if necessary, diplomatic negotiations. The program for the future doubtless needs

modification. There are probably enough sanatoria if the patients to be sent there are carefully enough selected. The next development is a *Hospital Sanatorium*, of larger capacity and scope. There are good examples at Strasbourg and at Nancy. The Hôpital-Sanatorium Villemin, at Nancy, represents the most modern type. It has 250 beds, in four stories, and two pavilions each, for men and women. There are laboratories, conference rooms, modern radiological apparatus, and long galleries for the outdoor cure. There are never over 6 beds to a room, and there are 15 single rooms. Between the two pavilions are sun porches. All classes of patients are accepted. In the Département of Meurthe and Moselle the antituberculosis organization supports smaller hospitals with certain rooms reserved for tuberculous patients. Such a hospital sanatorium as that at Nancy is a veritable research centre. The facilities and opportunities surpass those of the sanatoria, where the director is overloaded with administrative cares. In Alsace, and also in certain parts of old France, the Federation of Medical Syndicates has concluded with the provincial tuberculosis association a contract regarding dispensary service and its relation to practising physicians. The dispensary nurse is a very important agent, but she must not o specialize or the patient soon become whelmed with advice. Recently the League has devoted much attention to infantile prophylaxis. Now the importance of the industrial side is looming large and problems of industrial hygiene are coming to the fore. Tuberculosis is one of the so called social diseases and is intimately bound up with the conditions of life. In reaching these the League has undeniably accomplished and is accomplishing much.—*Les enseignements de la lutte contre la tuberculose, Malooz, Rev. Belge d. l. Tuberc., July–September, 1926, xvii, 164.*—(*A. P.*)

Antituberculosis Campaign in Meurthe-et-Moselle, France.—*Origin:* Twenty-five years ago Paul Spillmann created the *Oeuvre Lorraine des Tuberculeux*, with the support of prominent citizens of Nancy, and in 1902 was opened the *Sanatorium de Lay-St. Christophe*, with 60 beds. Despite all efforts there was an annual monetary deficit to make up, and during the War the institution was taken over by the military service. Afterward financial difficulties multiplied, and finally the city hospitals of Nancy were asked to take over the work. On January 15, 1924, the Sanatorium was reopened, increased to a 120 bed capacity. In 1904 there had been projected at Nancy a special hospital for the tuberculous of all stages, and at the end of the War began to function the Hospital-Sanatorium Villemin, the most modern of its kind in France, with an adjoining dispensary equipped to function in accordance with Calmette's plans. In 1920 it had 250 beds and was closely coördinated with the medical faculty of the University of Nancy. The Villemin Dispensary was the idea of Krug and his associates of the Civil Hospital Commission, and but for the War would have been carried into effect by October, 1914. The Departmental Committee for the Assistance and Relief of Returned Tuberculous Soldiers transformed itself later into the Office of Social Hygiene and Defense Against Tuberculosis in Meurthe-et-Moselle, being aided at the outset by the Rockefeller Commission. It organized four antituberculosis dispensaries, with the formation of local committees in each *arrondissement. Objects and Methods:* To combat tuberculosis is really to campaign for better hygiene, and thus for improvement of the race and of individual resistance, especially in children, against disease. The primary elements in this vast program are: *1:* Instruction and prophylactic education. *2:* Activities of physicians and dispensaries. *3:* Hospitalization of the tuberculous. *4:* Preservation of children. *Instruction and Prophylactic Education:* Since the opening of the Hospital-Sanatorium Villemin in 1914 two tuberculosis clinics were organized, under university auspices. These really began to function in March, 1920, and have been of social as well as medical significance. Fourth-year medical students attend them two mornings a week. They examine and present patients, receive instruction, assist at radioscopic examinations, are instructed in laboratory methods and artificial pneumothorax, etc. They also devote some time to the consideration of the social problems involved. Several of the pupils have since assumed the direction of antituberculosis dispensaries, and this instruction has proved profitable to both physicians and regional organizations. Valuable instruction is also given to future social service nurses. The Villemin Dispensary receives nurses through the Rockefeller Commission or the League of Red Cross Societies (English, Belgian, Dutch, Polish, Czecho-Slovak, Hungarian), who have equal standing and opportunities with French nurses. General hygienic instruction and propaganda is carried not only to the poorer working classes but, in Nancy, especially, to the great middle class, who are really far in advance of the rich, who often think they know but are really

blinded by prejudice. *Participation of the Medical Profession:* A satisfactory accord has been maintained between the Office of Social Hygiene in Meurthe-et-Moselle and the Syndical Association of Physicians of the Department. All dispensary activities are accepted and approved by this association and the physicians are encouraged to make use of the dispensaries. A dispensary should have at its disposal all means of placement and necessary information. In order to persuade the tuberculous to avail themselves of these it is absolutely necessary that they be told the truth. No longer is such a statement considered a death sentence or a disgrace, and from the prophylactic and therapeutic viewpoint it is demanded. On the other hand, the dispensary must avoid points of friction between the medical and social bodies: unreasonable investigation, intervention in treatment, opinions about the action of the attending physician, systematic treatment of patients referred for consultation. In other words, there must be a loyal collaboration. The practising physician is free to report to the office of the General Secretariat any acts which he deems reprehensible, in order to avoid their recurrence. That the service has medical approval is shown by the fact that, while in 1921 only 10 per cent of patients were referred by their physicians, in 1924 the figure was 60 per cent. Pharmacists are also urged to collaborate by sending in patients who call for "syrups" before consulting a physician. People are warned against fake "cures," noisy claims, and false statements. *Dispensary Service:* The Department of Meurthe-et-Moselle has 10 dispensaries, the *Dispensaire Villemin* being the central one. Each is directed by a medical specialist, who however has also his own practice, a system which works much better than that of having exclusively dispensary physicians. All these physicians belong to the syndicate, and must present evidence that they are not only technically but administratively suited to their task. Precocious specialization is deplored, and the opinion of the *Union* of the syndicates favors a prerequisite of five years' practice before specialization, or of its equivalent in hospital work. The dispensaries have one or more visiting nurses, all graduates, and each has a *Comité de patronage et d'assistance.* Each has a radiological equipment, some a small laboratory, the central one more extensive laboratories, and there are close relations with hospitals, Red Cross Societies, etc. The number of placements of patients made through dispensaries has increased from 282 in 1921 to 1242 in 1924, that of children from 126 to 669. The Villemin Dispensary has been enlarged and is fully equipped with waiting and examining rooms, telephonic communications, special booths for questioning, etc. The radiographic and laboratory services are common to the dispensary and hospital-sanatorium, which is convenient for both. The visiting nurses keep in touch with patients who have been hospitalized. There are also a dental cabinet, laryngological outfit, douches, and skilled personnel. The dispensary is the place of selection and distribution for the Hospital-Sanatorium, Sanatorium de Lay-St. Christophe, and the Flavigny Preventorium, as well as the centre of collaboration for the other dispensaries and numerous agencies, such as the medical inspection of the city schools, departmental office of the disabled, Red Cross Societies, and others. There were 1833 new consultations in 1924 and 3428 radioscopies, while the nurses made 9255 visits. *Hospitalization of the Tuberculous:* The Hospital-Sanatorium is a new factor designed to fulfil the needs of every type of case, but especially those patients too ill to be suitable for the sanatorium proper, or those whose condition has become aggravated after being at a sanatorium. The *Hôpital-Sanatorium Villemin,* with a capacity of 250 beds, is a four-story structure, each story divided into pavilions for men and women, with the personnel quarters in between. Each story of each wing has a dining room, living room, and rooms of six beds and one bed; general service office, toilet, baths, and dressing rooms, these last on the north side; electric elevator and central heating. The top story has 15 one-bed rooms and covered roof-gardens on the wings. Between each two pavilions are *galeries de cure,* and there is a spacious garden and promenade. There are modern sterilizers and driers. The patients are cared for by the Sisters of St. Charles, who have been specially trained. The *Sanatorium de Lay-St. Christophe,* at 7 km. distance, privately founded, has been ceded to the Civil Hospitals of Nancy as mentioned, following the war. It has 150 beds, and is located in the open country at an altitude of 270 metres, with southern and southwestern exposure, dominating the valley of the Meurthe, but above the fog level. It is a two and a half-story structure, divided into male and female halves, with rooms of 4, 6 and 10 beds, and a few single isolation rooms. There are well protected curing porches. All the curable tuberculous are, if possible, sent here, the others to the Hospital-Sanatorium Villemin. It is under the same administration, the price is the same, and exchange is easily effected between the two. There are also special Tuberculosis

Pavilions for the incurable tuberculous at the hospitals at Luneville, Briey, Toul, Longwy, Baccarat and Pont-à-Mousson, bringing the total available beds up to 500. This methodical and well developed organization is simple, logical and practical. Photographs and diagrams are included.—*Organisation de la lutte anti-tuberculeuse en Meurthe-et-Moselle, L. Spillmann and J. Parisot, Rev. Belge d. l. Tuberc., December, 1926,* xvii, *248.*—*(A. P.)*

Belgian Antituberculosis League in 1925.—The Secretary-General, Renauld-Capart, summarizes the principal activities and organization of this work. An important new development has been in the new industrial region of Limbourg, with the collaboration of Stassen, medical head at the Winterschlag coal mines. The dispensary of Beveren Waes has been established, and a children's section added to the sanatorium at Magnée. An agreement has been concluded with the National Christian Anti-Tuberculosis Alliance, a recognized mutual aid association, regarding dispensary work and admissions to the Sanatorium at Mont-sur-Meuse. The League has received as a delegate Van Campenhout, professor of the School of Tropical Medicine and Inspector-General to the Ministry of the Colonies. Dewez is at present interested in organizing a stamp sale, part of the proceeds of which shall go to nurses' pension and sickness indemnity for tuberculosis, and part to the purchase of such adjuvants as codliver oil and iodotanic syrup. The Committee in Charge has also created a Finance Commission to make studies and report. Recently state subsidies have been decreased and important problems raised. Among the scientific activities has been a series of valuable lectures. Popular propaganda has continued, and through the Belgian Red Cross certain films have been shown to the public. The work of each section of the League is reported in detail by its head. *Antwerp Section:* A sanatorium for tuberculous children has been established in connection with the Sanatorium Lizzie Marsily, accommodating 50 boys and girls of from 3 to 14. A pavilion has been set aside for pneumothorax therapy, in charge of Paternotte. Special placement of infants from tuberculous families has been attempted, and efforts are being made to provide funds for nursery. Artificial heliotherapy has been instituted with excellent results. Sanatorium schools have been established and are carried on by specially trained personnel. *Brabant Section:* Statistical tables are presented concerning patients, consultations, special treatments, alimentary assistance, and results, by Olbrechts and Villers. *Oeuvre de la Préservation de l'Enfance* contre la *Tuberculose:* This deals with the sound issue of tuberculous people or those in a tuberculous environment. The children are recruited from the League dispensaries, and now total 343, of whom 203 remain in placement. Colonies are maintained at Flobecq and Berthem-l-Louvain, a home at Breedene-sur-Mer, and a nursery at the Edith Cavell School. Breedene maintains a farm, and has a protected and carefully chosen site. Berthem takes older girls and looks after them during their developmental period, with remarkably good results. *Section of Western Flanders:* DeWinter makes a special report on the work of the King Albert Dispensary at Bruges, which maintains close connection with the Hôpital Saint-Jean. Domiciliary isolation of dangerously ill patients is termed impracticable. Hospitalization also facilitates the application of therapeutic pneumothorax when indicated. Fluoroscopic facilities have been extended and certain mutual aid societies are now urging their members to use the dispensaries or seek sanatorium care. Disinfectants, sputum cups and thermometers are distributed, as well as milk supplies and propaganda. At Ostend, Reynaert reports the installation in the dispensaries of radiographic and radioscopic facilities, also ultraviolet-ray apparatus and pneumothorax outfits, especially for refills of former sanatorium patients. *Section of Eastern Flanders:* There are provincial dispensaries at St. Nicholas, Alost, Witteren, Hamme, and Lakeren, and a large central one at Ghent. About 1100 new patients consulted this dispensary and there were 1425 radioscopies and 1065 sputum analyses. Fifteen patients have had pneumothorax, with about 200 punctures. An annex has recently been added to the Sanatorium at Hynsdaele, for young girls. Statistics are given covering 11 other sanatoria. *Hainaut Section:* There are 20 institutions in this section, including dispensaries, sanatoria and children's colonies. Special space is given to the work of the Charleroi dispensary and the Sanatorium Warocqué, which maintain close affiliations. The alimentary regimen of the sanatorium is emphasized. Heliotherapy, vaccinotherapy and pneumothorax are also used. Too many patients in advanced stages apply to the dispensary and too few in early stages are willing to undergo sanatorium treatment, according to Dascotte and Lechien. *Tournai: I: Report of L'Oeuvre de la Préservation de l'Enfance:* Langelez reports a total of 339 children under surveillance up to the end of

1925. Recently he has made skin tests on a considerable group, controlled radiographically in 147 cases. The *Oeuvre* maintains the Villa Marie-Jose, at Marcinelle, which accommodates 30 boys and 30 girls, the condition essential to admission being the presence of a family focus, although certain apparently pretuberculous cases, without a direct source of contagion, have been admitted. Reports from the Villa Piérart and Sanatorium Edith Cavell at Obourg are included by André. *Liége Provincial Section:* This includes Liége, Waremme, Verviers, and Eupen, each of which maintains main and subsidiary dispensaries, reports of which are included. Arrangements are made to hospitalize certain children at the Marine Sanatorium of Breedene, Knocke-sur-Mer, and the Institut Notre Dame de l'Yser, and also for family or colony placement. *Sections* of *Limbourg* and *Luxembourg:* The former maintains 10 dispensaries and allots them annually a subsidy of 15,000 francs. Luxembourg maintains 3 dispensaries and emphasizes prophylactic work. *Section of Namur:* There are 4 principal dispensaries receiving governmental subventions, which however are insufficient. *Sanatorium Reports:* Those of the Sanatorium Brugmann, Alsemberg, and the Sanatorium de Mont-sur-Meuse, are included in some detail, by Falloise and Therasse. The former is in the province of Brabant, the latter that of Namur. *Belgian Antituberculosis Armanent:* This is set forth in detail for each province and consists of *I: Dispensaries:* enumerated and located, with name of director of each. *II: Sanatoria:* There are (1) "popular" sanatoria, 3 for Antwerp, 5 for Brabant, 3 for Western Flanders, 1 for Eastern Flanders, 2 for Hainaut, 4 for Liége, 2 for Namur, and 3 located in Switzerland, at Montana-sur-Sierre, of which one is for invalid private soldiers, one for officers and functionaries, and one for children. These have a capacity of 35, 16, and 80 beds. There are also 3 (or 4) private sanatoria, three of them by the sea, the largest having a capacity of 150 beds. The "popular" sanatoria cited have a total bed capacity of 1722. *III. Childhood Prophylaxis:* This is carried on by the *Oeuvre* and affiliated organizations, maintaining 3 preventoria in Antwerp, a nursery, colony, 2 homes and an organization for family placement in Brabant, a placement institution in Eastern Flanders, 2 preventoria and 3 dispensaries in Hainaut, and 6 dispensaries and 6 institutions in Liége province. Family placement is carried out in Luxembourg. *IV: Preventoria and Colonies for Debilitated Children:* The marine preventorium of Clemskerke-sur-Mer is maintained by the Solvay foundation, and numerous colonies are maintained by the *Oeuvre Nationale de l'Enfance. V: Hospitalization of the Incurable Tuberculous:* The facilities for each province are detailed. *VI: Antituberculous Prophylaxis in the New-Born by BCG Vaccine:* This is obtainable at the Laboratories of Provincial Hygiene of Ghent, Liége, and Mons. The names of vaccinated children are desired by the League dispensaries for future surveillance.—*Ligue Nationale Belge contre la Tuberculose, Rapport Géneral pour 1925, Rev. Belge d. l. Tuberc., May–June, 1927, xviii, 93.*—(*A. P.*)

Work of Belgian Antituberculosis League.—*La Ligue Nationale Belge contre la Tuberculose* was organized in 1900, following the session in 1897 of the International Congress of Hygiene and Medical Climatology of Belgium and the Congo, and the nomination in 1898 by the Royal Society of Medicine of a "provisory committee" for this purpose, at whose disposition was placed the sum of 1500 francs to cover the initial expenses. The first President chosen was Dr. Felix, who after a few months was replaced by Dr. Dewez. The League organized systematically and scientifically the campaign against the disease, and extended its activities and influence as far as its resources permitted. It had no official character but was created by the devotion, goodwill, spirit of sacrifice and energy of a few large-hearted men whom the ravages of tuberculosis had greatly moved. From its beginning, the then Prince and Princess Albert showed great interest and solicitude, which continued unabated after their accession to the throne. There were Provincial Sections and a Central Directing Committee, which supervised and stimulated those sections needing it. If the acts of any section seemed to prejudice the success of its work, this committee retained the right, after a hearing, to dictate any measures regarded as necessary. The committee prorates the annual needs of each section and publishes an Annual Report of the work accomplished. *Resources:* From very small initial budgets there was reached in the years immediately preceding the War, a sum of about 500,000 francs annually (1900, 4600 frs; 1904, 8300 frs; 1908, 393,000 frs; etc.). The Belgian Government, in 1911, contributed 3 per cent of the budget, the provinces and communes 22 per cent, private generosity 75 per cent. The activity and devotion of the Lady Patronesses was responsible for much in the way of funds. In spite of its variable resources, the League had, by 1914, succeeded in creating and

assuring the function of numerous dispensaries, several sanatoria, open-air stations, and villas for delicate children, and carried on throughout the country an active propaganda. At the beginning of the War, however, pecuniary subsidies were reduced or suppressed entirely; certain establishments were destroyed, others closed by dispersion of personnel, exodus of population, or other obstacles. Thus, between 1914 and 1918, during the German occupation, tuberculosis progressed until its mortality figures became doubled. The League then solicited the aid of the National Relief and Food Committee, which allotted a subsidy of, first 10,000 frs. monthly, then 15,000, finally 100,000 frs. to permit the League to carry on the necessary work. Dispensaries opened up, new dispensaries and assistance centres were organized, and visiting nurses were sent out, especially in the cities and industrial regions; refectories for the tuberculous and pretuberculous were establshed; sanatoria resumed their activities and were able to hospitalize thousands of patients. After the armistice the Government continued to render important subsidies: in 1920, 6 millions 720,000 francs, gradually reduced to 3,500,000 in 1926. However, in 1924 the provinces raised their contribution to about 800,000 francs. The Government, while intervening financially, has left the League its autonomy and reserved only the right to control the employment of its funds. It is forbidden to interfere with the medical functioning of the work. *Objects of the League:* Its mission is especially prophylactic and educational, although it interests itself also in sanatoria and other institutions of treatment. It maintains dispensaries established along the lines laid down by Malooz and Calmette. In principle, they abstain from treatment, but pursue a triple end: *1:* Detection and diagnosis through medical consultations. *2:* Family prophylaxis, through advice, domiciliary isolation, disinfection, furnishing of sputum receptacles, bettering of housing conditions, etc. *3:* Alimentary assistance where needful. *Medical consultation* is the fundamental object of the dispensary. As soon as a patient is diagnosed nontuberculous, the dispensary is finished with him. If, on the other hand, he is recognized as tuberculous, all the mechanisms controlled by the dispensary are at his disposal. He will be the object of a medical and social investigation and all means taken to avoid his contaminating his surroundings, if at home; or he may be sent to a sanatorium or hospital, or given relief if indigent. *Domiciliary prophylaxis* was first carried on both by special investigators and by charitable persons, principally lady patronesses. They both gave advice and rendered services. But since 1916 the Directing Committee has made use entirely of a specially trained personnel, "certified visiting nurses." There are over 100 of these. *Alimentary assistance* takes the form chiefly of milk, lard, fats, and codliver oil, but clothing, beds, coal, etc., are also supplied in many cases. The League also has a close connection with the Societies of Mutual Relief, and has an agreement with the Federation of Associated Mutuals of Belgium, whereby League dispensaries are available for diagnosis and prophylaxis, and another similar one with the Christian Federation. The number of dispensaries rose from 5 in 1900 to 24 in 1914 and 120 in 1918; in 1920 it fell to 60, but in 1924 rose to 99. *Preservation and Protection of Childhood: Oeuvres de prêservation de l'enfance:* These are especially interested in removing the healthy child of tuberculous parents from sources of contamination as soon as possible after birth and placing him either in the country or in colonies, familial or collective placement, the first in healthy families. On the other hand, the *Oeuvres de protection de l'Enfance* concern themselves with children already infected, whom they send to the country or seashore, to appropriate establishments. They detect children in whom benign forms of the disease have already appeared, chiefly lymphatic. As early as 1903 in the Antwerp section there was an establishment at Wenduyne by the sea, the *Villa Maritime.* At present nearly 1000 beds are available, representing five provinces and ten establishments. Of 3000 children placed between 1911 and 1920 by the *Oeuvre de la prêservation de l'enfance* of Brussels, only one death from tuberculosis has occurred. During the past two years the League has also instituted Calmette's prophylactic vaccination of the newborn in its dispensaries. *Sanatoria:* Sanatoria belonging to the League or affiliated with it comprise about 800 beds and care annually for over 2000 patients. *Propaganda:* This has been actively carried on since the organization of the League, with the aid of local committees of Lady Patronesses. The latter visit patients, encourage them, distribute food, clothing, beds, and also organize benevolent festivities and theatricals which bring in considerable money. In 1910 they raised over 120,000 francs from special stamp sales, and the next year over 200,000. The League has also distributed many tracts, brochures and catechisms, and with the coöperation of the press energetically combated the disgusting spitting habit, without the aid of any special legislation. It has lent its aid to improve

housing, to bring about obligatory reporting of tuberculosis, and to favor setting aside of special tuberculosis pavilions in general hospitals; also for hygiene of milk and dairies. The Rockefeller Commission lent its aid to the League and held demonstrations in Brussels, also distributing antituberculous cinema films, which the League eventually purchased. These were very useful in such places as Brussels, Liége and Hainaut. The tract, Principles of Hygiene, was distributed to schools and organizations and among sanatorium patients. *Collaboration with Physicians and Scientific Activity:* The League has succeeded in interesting all the leading Belgian phthisiologists, who accepted places on its committees or became affiliated with its institutions. There are 210 physicians connected with it. The Directing Committee has instituted monthly scientific reunions, where specially competent members or visitors make known their work or the fruits of their experience and studies. A price of 500 francs is given annually for the best original work bearing on tuberculosis. It has appointed special commissions to study and decide technical social or medical questions arising. It affiliated with, from the time of its creation, the *International Association Against Tuberculosis*, later the International Union, and has taken an active part in international conferences, besides founding a library and publishing *La Revue Belge de la Tuberculose*. Since 1919 the tuberculosis mortality in Belgium has diminished from 1.80 per 1000 to 1.06 per 1000 persons.—*La ligue nationale belge contre la tuberculose, 1900 à 1925, A. Falloise, Rev. Belge d. l. Tuberc., March–May, 1926, xvii, 53.*—(*A. P.*)

Prevention of Tuberculosis in Belgian Children.—On January 2, 1916, the hospital buildings at Marcinelle were taken possession of by the *Oeuvre de la préservation de l'enfance* of Belgium, created by the Belgian *Ligue nationale contre la tuberculose*. The location was well chosen from the point of view of easy access and salubrious surroundings. It is geographically almost in the centre of the thickly populated Charleroi region. In 1919 the Villa Marie José was established in its own buildings at Marcinelle Bruyère. The buildings consisted of some old remodelled houses, some adapted military barracks, situated in the highest place in the Charleroi region, on the edge of a vast forest, with abundance of sand, verdure, and flowers. At the time of installation the Villa accommodated 60 children, 30 of each sex, and up to the present has cared for 661 all told. Girls are admitted up to 14, boys up to 12. They have separate quarters, each under the surveillance of a matron. Around the institution stretches a vast plain of sand, with all facilities for play and instruction in the open air. The sole aim is to isolate from infectious foci living children in contact with tuberculous persons and specially menaced by tuberclosis and to bring them up amid healthful surroundings. The children are recruited from the Charleroi dispensary. The essential condition for admission is the presence in the home of a sick relative, a focus of infection, usually father or mother, sometimes others of the family or lodgers. Ocasionally really "pretuberculous" children are admitted, those in a debilitated state convalescent from acute pulmonary diseases, more rarely those with adenitis or closed tuberculous bone lesions. There is no fixed stay, and often isolation must be prolonged to be effective. Sometimes, after the death of the original tuberculous individual another of the family, often the consort, develops the disease. The principal reasons for the large proportion staying but a brief period are lack of adaptability to communal life, unwillingness of the parents, and defects or diseases which are unsuitable for institutional homes, such as urinary incontinence, scabies, tinea, unruliness, etc. Of the 661 children cared for, 61 stayed less than a month, 55 over two years, the remainder for varying periods. *Follow-Up:* This was made difficult by repeated change of domicle, occasional change of name (marriage) and other reasons. The first obvious finding from the data obtained was the frightful mortality among the tuberculous parents of the children. Regarding the children themselves, 609 out of 661 could be traced, of whom 595 were found to be in good health. Nine children had died and 5 were tuberculous. *Mortality:* Of the 9 children dead, 3 died from other infections than tuberculosis. The tuberculosis mortality was less than 1 per cent, 4 dying of pulmonary tuberculosis, 2 of Pott's Disease. *Morbidity:* Three children developed bone or joint tuberculosis, one lupus, and one pulmonary disease. *Life of the children:* The life is distinctly domestic in character, without too rigid discipline or surveillance. Each child has a daily medical record, on which are entered height, weight, thoracic perimeter, every two weeks. Hygienic care and regular bathing are seen to. The sand is utilized for many activities. Education is not neglected but is adjusted to fit their health. Open-air instruction is the rule and the Montessori system is adopted. New buildings are needed and means for earlier diagnosis of adult disease. A child left for only a few months with contagious parents is

fatally contaminated.—*Neuf années de préservation de l'enfance, A. Langelez, Rev. Belge d. l. Tuberc., March–May, 1926, xvii, 116.*—(*A. P.*)

Rural Antituberculosis Dispensary in Belgium.—A survey is made of the various functions exercised, as follows: *Detection:* This is made by the practising physicians of the vicinity, the school medical inspectors, the workmen's physicians, the inspectors of the *Oeuvre nationale de l'Enfance*, and finally by the patients themselves and the visiting nurses. Patients coming through any of these agencies to the dispensary are subjected to a complete investigation, comprising clinical and sputum examinations, cutireaction, and radioscopy. The clinical questionnaire and examination are very complete. Search of the sputum for tubercle bacilli is emphasized as just as necessary as auscultation, percussion, taking of temperature, pulse or weight, or X-ray examination. When possible the sputum is examined in the patient's presence, and reëxamined, if negative, several times; if positive, he is so told and given instruction on the causative agent, mechanism of contagion, etc. It is regarded as a moral obligation to reveal to the patient the exact nature of his malady, that he may avoid errors in living and protect his surroundings. All patients who cough and spit have their sputum examined. Examination of the concentrated sputum is often practised. The tuberculin cutireaction is performed on all children coming to the dispensary for consultation, and is of aid in cases of anaemia and debility, enlarged lymph nodes, surgical lesions, and the recently exposed. The *tuberculin brute*, furnished by the Pasteur Institute, and Koch's Old Tuberculin, are used. The reaction is less frequently positive in the country than in the city. It is almost constantly positive in children in contact with tuberculous persons. Radioscopy has been found valuable in the early diagnosis of pulmonary tuberculosis in the adult and the diagnosis of tracheobronchial adenopathy in children. The site and extent of pulmonary lesions are well determined, and mediastinal tuberculosis in children. *Education:* The dispensary pursues an active educational program. In the course of its consultations it instils prophylactic precepts and the rules of the hygienic-dietetic cure. These are carried to the home by patients and visiting nurses, and by distribution in families, mutual societies, workshops, and schools, of pamphlets, tracts and notices. Lantern-slide projections help to put these things before the public. Also, each week, there are inserted in the local press popular articles on tuberculosis. *Assistance:* Alimentary assistance includes monthly distribution of milk, sardines and cocoa. Therapeutic assistance is carried on with due respect to the dignity of the medical profession. The medicaments of choice are codliver oil, tannin, phosphates, creosote compounds, arsenic and iodine medication, and tuberculin. Sputum containers and thermometers are furnished when necessary. Domiciliary isolation is supervised and it is sought, without much success, to prevent nocturnal cohabitation by furnishing sleeping materials. Debilitated "lymphatic" children without fever are sent to the colonies of the *Oeuvre de protection de l'Enfance*, those with surgical tuberculosis to the maritime sanatorium of Brudine-sur-Mer, pulmonary cases to the sanatoria at Boitsfort and Auderghem. Infected children are placed in establishments of the *Oeuvre de préservation de l'Enfance.* Antituberculosis vaccination of the newborn issue of tuberculous parents with *BCG* is employed free of charge by the Provincial Institute of Bacteriology of Liége. Disinfection of sputum is attended to by the dispensary nurses, that of houses by the Institute of Hygiene and Bacteriology of Namur. The activities of the dispensary radiate throughout the canton of Gembloux. It is attached to the provincial section of Namur of the Belgian National Antituberculosis League and receives a subsidy from the province. Since its establishment about 5000 patients have been examined, mostly of the working class and small bourgeoisie. *Results:* These are considered encouraging, particularly from the public health standpoint, but further and continued efforts are required.—*Un dispensaire antituberculeux rural, Lefevre, Rev. Belge d. l. Tuberc., March–May, 1926, xvii, 104.*—(*A. P.*)

Antituberculosis Campaign in Belgian Coal-Mines.—The history of the development of such services is traced, chiefly within the last century. The creation of departments for care and relief, construction of workingmen's habitations, pecuniary subventions for mutual relief, loan associations for purchase of land and dwellings, have all been realized by the employers, without government intervention. During this early period, however, the physician was regarded only as a therapeutist, and was only exceptionally consulted concerning medical and hygienic problems in the organization and management of the mines. The physician in industrial communities was considered by the mine operators as a benevolent parasite, only sought in case of necessity. The period of social medicine really began early in the twentieth century, signalized by

a more direct intervention of public agencies, more intimate collaboration of owners, physicians and workmen. About 1900 an epidemic of ankylostomiasis decimated the working population of the mines on the plateau of Aus-Montegnée and the owners, made anxious, acquiesced readily in the suggestions of Dr. Malooz for combating its ravages, soon backed by governmental authority. In 1905 the putting into effect of the law governing accidents of work extended medical authority still further. It was rarely possible, because of the risks incident to occupation, to make arrangements for insurance except at very high rates. The mine owners soon found that the only practical way to comply with the law was the humanitarian way, of suitably caring for their injured workmen. Therefore, they established surgical clinics. Later on, the miners' mutual organizations found it desirable to eliminate from their benefits workmen with physical defects. It was necessary to list these and to have all applicants submit to a physical examination. In order not to betray professional secrets, the examining physician was only to inscribe on a card the words "fit" or "unfit" for work. Also, medical visits at the employment office served as a check against fraud. Later on still, there arose psychological problems, and Henry, among others, has recommended a methodical classification of questions to be put in writing, concerning qualities which should be possessed, together with a medical visit to the employment office. By this means certain workmen can be eliminated from tasks for which they are unsuited. There are some physicial defects which may endanger the security of many other workmen. In 1908 the royal orders concerning resuscitation and rescue went into effect and rescue stations were established, possessing portable respiratory apparatus. In 1911 the construction of shower-baths for workmen was ordered. After the War pecuniary allocations and sanitary instruction of adolescents were instituted. Family allocations were begun in 1923. Compensation is made for accident, disease and invalidism, and there are also old-age pensions and relief funds for special purposes, including intellectual improvement. For twenty years the greatest medical problem has been that of centralization and coördination of services. The dispensary may be said to be the centre of the scheme represented diagrammatically. This is in touch with four main services: *1: Medical Visiting Service to the Employment Office:* This service has been recognized as indispensable since 1908, in both the Espérance and Bonne Fortune mines, and when sanitary supervision of adolescents was ordered, in 1920, a centralized medical visiting service for all the mines of the plateau of Aus-Montegnée was put into effect. Each workman has a special card and all these are filed alphabetically. The "pretuberculous" and cardiopulmonary cases are refused employment or directed to something more suitable. Workmen rejected for the mines have the privilege of enquiring at the Unemployment Bureau or the school. The Provincial School for the Disabled and Infirm does excellent work, especially in teaching the shoemaking trade. *2: Accident Service:* A rescue station is attached to the dispensary, which includes a surgical clinic, with X-ray and physiotherapy apparatus. A secretary has charge of the records. *3: Medical Service:* All workmen ill over [illegible] days, and adolescents in need of medical supervision, either go periodically to the dispensary or are visited at home. They continue treatment with their physician, but if necessary are directed to special services. The "pretuberculous" and tuberculous are sent to antituberculosis dispensaries or to sanatoria. All recommendations and advice are entered on the workmen's cards. If disability persists, arrangements are made for a pension. *4: Industrial Hygiene Service:* The large industrial societies have constructed numerous workmen's dwellings, rented at reduced prices, provided the children are employed at the works. The influx of foreign workmen has necessitated their housing in quarters resembling the Tower of Babel, holding up to 100 men of different nationalities. These, as well as the workmen's washrooms and refectories, are medically supervised. The dispensary of the Espérance maintains close relations with the Medical Inspector, the Institute of Bacteriology of Liége, the Inspector of Hygiene, and the Provincial Service for Analysis of Watér. Tables are shown illustrating the reduction in disease and accident morbidity since the organization of medical services in the coal mines.—*Les services de Médecine et d' Hygiéne industrielles dans les grands charbonnages belges et la lutte contre la tuberculose, M. Stassen, Rev. Belge d. l. Tuberc., January, 1926, xvii, 9.*—(*A. P.*)

Sanitary Situation in Belgian Congo.—The Congo Free State was founded in 1885 and put under Belgian sovereignty, becoming a colony, in 1908. It then had a scattered backward population, mostly anthropophagic, with a tribal organization under chiefs. Pursuit of slaves was common. Periodical epidemics, especially of measles and sleeping-sickness, decimated the

population. Geographically the eastern portion is a region of mountainous "massifs" and high plateaus, of from 1000 to 4000 metres altitude, the crest of this massif extending from Rhodesia to the Sudan. Its edges drop abruptly, and here are formed great lakes,—Albert Edward, Tanganyika, Kion, Bangwelo, etc.,—which serve as reservoirs and sources for the Nile, Congo and Zambezi rivers. The Congo basin occupies a vast area on both sides of the Equator, almost flat, and in geological times a great inland lake. Its western limit is marked by the mountainous massif of the Monts de Cristal, running parallel to the coast, where it terminates in a gentle declivity. The bed of the Congo is broad and shallow, with numerous islands, at times submerged. The Central Congo is occupied by a vast forest, sending prolongations eastward, and on the Atlantic side of the Monts de Cristal is another forest, the Forest of Mayumbi. The water courses are bordered by wooded tracts or "galleries." The climate is mostly equatorial, uniformly warm and moist, with a mean temperature of 28°C., and humidity between 90 and 99 per cent. The saturation of the air with water-vapor results in condensation in the form of mists, which are chilling. There is excessive perspiration and constant struggle against overheating. The luminosity of the air is high. In the higher eastern and northeastern sections the climate is tempered and more bearable, and only here is acclimatization possible for white races. A return to a temperate climate at least every two years is almost indispensable. In the higher northeastern section, where the soil is especially rich, and the climate most salubrious, there are considerable possibilities of colonization, but means of communication will have to be further developed. The mines are the chief industrial asset, including copper, tin, radium, cobalt, coal, gold and diamonds. Palm oil for soap is produced, cotton, rubber, cocoa, coffee, maize, various woods, and rice. Administratively the Congo is under a Governor-General, and is divided into five provinces, each of which is subdivided into districts and territories. *Demography: 1: White Population:* In 1924 there were 12,361 white persons, among whom there were 173 deaths, a mortality of 13.9 per 1000. Over half of the deaths of which the cause was known in 1923 were due to malaria. During that year 6,571 cases of disease were treated in the hospitals, of which 834 had malaria. Many cases are not hospitalized. This is the chief cause of premature repatriation, neurasthenia also intervening as a factor. This develops easily in the tropics and leads to rapid and profound deterioration. Amoebic dysentery is endemic but is being conquered. It is dangerous to send tuberculous persons, even cured, to the tropics. Activation, aggravation and rapid evolution occur. *2: Colored Population:* It is impossible to give any real estimate of their numbers, but there are probably not over 10 million. There used to be important plantations, prior to the white occupation, but trading and slave-chasing broke up these along the main routes. The relaxation of family ties helped. These deserted river-bank villages lead one to suppose a degree of depopulation which is not proved, as these people are very nomadic by habit. In 1923, roughly 131,000 cases were treated in hospitals and dispensaries, with 3,720 deaths, two-fifths due to pneumonia and sleeping-sickness. Next to these come measles, grippe, dysentery and tuberculosis. In 1924 the number of patients recorded increased to about 184,000. *Principal diseases: 1: Pneumonia:* This is one of the gravest diseases for African natives. At Katanga, a relatively cold region with largely imported population, the mortality among pneumonia patients was nearly 50 per cent, and for other provinces 20 per cent. *2: Measles* and *German Measles* have caused serious epidemics, notably at Stanley-Pool. *3: Syphilis* is increasing, especially around the centres of occupation. It is desirable that provision be made for free distribution of medicines to syphilitics and that obligatory treatment be imposed. *4: Yaws*, due to Castellani's spirochaete, is widespread, but is being effectively combated by antisyphilitic treatment, especially arsenic and bismuth. *5: Tuberculosis:* This is an imported disease which hardly existed prior to 1900. Its infiltration is partly of European origin, but perhaps more largely due to neighboring colored races,—Arabs, Hindus, and negroids. Its evolution is generally very rapid. Tuberculin tests of various groups and ages showed, for the province of Congo-Kasai, 7.5 per cent positive, province of the Equator 5.7 per cent. The following preventive measures were adopted by local Government edict in April, 1921: *1:* Entry into the colony of anyone having open tuberculosis was forbidden. *2:* Non-natives with open tuberculosis were to be expelled. *3:* Obligatory declaration of the disease was ordered. *4:* Care of affected natives was provided for, establishments being located at four towns (Bana, Leopoldville, Stanleyville and Buta). *6: Sleeping Sickness:* This, together with penumonia, is a most frequent cause of native morbidity and mortality. Existing prior to white occupation, it has since become more widely disseminated. The

tsetse fly lives everywhere in the Congo up to 1200 metres altitude, and especially along the wooded river-courses. In 1913 the first public attempts to combat the disease were begun, and a medical research laboratory was established at Leopoldville, in which prominent scientitsts volunteered their services. Various prophylactic measures have been tried without success, and sterilization of carriers by appropriate treatment now seems the most promising, tryparsamide being the most effective remedy. *7: Leprosy* is widespread and hardly controlled at all. *8: Infant mortality* is very heavy, being estimated at 50 per cent, but the black race is prolific, except in centres of European occupation, where it tends to die out. The malaria index is 80 to 90 per cent and verminous parasites are common. The *Oeuvre Nationale de l'Enfance de Belgique* takes an active part in work among black children. *Industrial hygiene and Sanitation:* The Governor-General's report for 1922 showed a little less than 5 per cent of an able-bodied male population of 3,300,000 engaged. Raw recruits, both in industry and the army, have a high mortality, often over 45 per 1000. Change of nourishment, surroundings and habit appears to weaken native resistance to infection. The methods of incineration of sewage employed are described. This is facilitated by the permeable soil. The spring water is generally good. Over 28 million francs have been spent for medical construction and over 14 million for native relief and general hygiene, from 1921 to 1926, not including 42 million for improved lodgings, 11 million for water supply in the towns, and other public expenditures. —*La situation sanitaire du Congo Belge, E. Van Campenhout, Rev. Belge d. l. Tuberc., July–September, 1926, xvii, 198.*—(*A. P.*)

Antituberculosis Insurance in Italy.—The Council of Ministers recently approved the antituberculosis insurance bill proposed by the Fascist government. The proposed bill guarantees to all sufferers of tuberculosis, sanatorium care, postsanatorium care and help for families of those stricken with the disease. It also provides for the establishment of 18,000 sanatorium beds and 2,000 convalescent beds within a period of ten years. The premium to be paid by the insured will be in proportion of his social status and earning capacity. The insurance is obligatory for all members of the working classes and for all those already insured against invalidism and old age.—*L'assicurazione contro la tubercolosi, Meeting, Second National Anti-tuberculosis Congress, Milan, October 23, 1927, reported in Tubercolosi, October, 1927, xix, 422.*—(*U. E. Z.*)

Massachusetts Antituberculosis Resources.—Massachusetts has prided itself on meeting the standard of one bed for each annual death from tuberculosis. The state also has, at least on paper, lots of diagnostic clinics, and there are many public-health nurses available for case finding. For the last three years, under the direction of Chadwick, the Department of Health has been holding clinics in the schools. Under the statutes hospitalization of adult pulmonary tuberculosis is the responsibility of the county or municipality for its residents, and of the state for that unfortunate group termed the "unsettled" case. Recent figures show a shortage of 665 county and 410 city beds, a total of 1075, unevenly divided through various counties and cities. Worcester, Middlesex and Boston show the chief shortage. In 1924 there was special legislation, allowing counties to contract for hospital service with one another or with the state. There then appeared to be an adequate number of beds. But since 1924 the State Sanatoria at North Reading and Lakeville have been turned over to children and nonpulmonary tuberculosis, respectively, and there have been increasing demands for beds at Rutland not filled under county contract, with an increasing waiting list. One factor is that, whereas five years ago 35 per cent of the known tuberculous demanded hospitalization, now over 50 per cent demand it. It has recently been decided that the Rutland State Sanatorium cannot meet its other obligations and continue to give contract service to Middlesex and Worcester, which must begin to look elsewhere. However, there are empty beds for the tuberculous at the admirable State Infirmary. *Charges*: By statute persons under 21 are cared for at seven dollars a week, and this includes practically all at Westfield and North Reading and about half at Lakeville. Private patients, that is, those not paid for by their town of residence, are also charged seven dollars. Perhaps this rate should be raised somewhat. For adult cases at Lakeville and Rutland the law prescribes that the charge must not exceed the cost, which is about $17.50 per week, about what Middlesex and Worcester now pay under contract. Thus, adults for whom the town pays will be taken at this figure. *Tuberculosis Dispensaries:* Adult visits to municipal dispensaries are falling off, but child attendance is increasing. For cities of 50,000 population or over, a mini-

mum standard must be established, especially in the work among contact and underweight children. The standards set up in the *Ten-Year Program* include routine tuberculin testing and X-ray examinations. Dispensaries and clinics should have a more uniform point of view and methods, and the courses at Westfield, and possibly later at North Reading, are a step in the right direction. When a case is reported there should be: *1:* Survey of the entire family. *2:* Tuberculin testing of contact children. *3:* X-ray of contact children. *4:* Follow-up of all contacts periodically. *5:* Examination of underweight children. The latter group, however, are of less importance than the contacts. Among cities of 50,000 and over, some criticism is made of the dispensaries maintained by Lowell, Worcester, Newton and Somerville. The last grossly neglects the dispensary law. Of cities and towns under 50,000, the minimum requirements are met, except by Fitchburg, Waltham and Marlboro. Discontinuance of the following dispensaries is recommended for other reasons: Southbridge, Webster, Plymouth, Winthrop, Weymouth, Melrose, Watertown, Woburn, Westfield, and Waltham. Revere has the best case-reporting to deaths-recorded ratio, 8.2 to 1, with Arlington, Clinton and Adams 5 to 1. In Northampton, Holyoke and Gloucester more deaths than cases are recorded.—*Present Resources for Handling Tuberculosis in Massachusetts, G. H. Bigelow, Boston M. & S. J., February 9, 1928, cxcvii, 1517.*—(*A. P.*)

Flaws in Antituberculosis Administration in England.—The following flaws are pointed out in the hope that this analysis may aid in future antituberculosis efforts: *1:* The failure of administrative efforts to recognize early infection. *2:* Failure to care adequately for early infection, particularly in children, even when recognized. *3:* Notification of cases is tardy because manifest evidence of disease must be waited for, and hence care is tardy. *4:* Lack of preventive measures.—*Gaps and Flaws in the Public Health Administration of Tuberculosis, J. M. Martin, Tubercle, August, 1927, viii, 501.*—(*B. H. D.*)

Flaws in Antituberculosis Administration in England.—The problem must be considered administratively and clinically, and the interrelation of the two must be maintained. Both as to treatment and prevention, much is lost through lack of coöperation in these two fields. Better use of institutions for the care of the tuberculous should be developed. More adequate training of clinical and administrative workers is also necessary, and it is essential that more effort be expended in improvement of living and working conditions.—*Gaps and Flaws in the Public Health Administration of Tuberculosis, D. P. Sutherland, Tubercle, August, 1927, viii, 508.*—(*B. H. D.*)

Flaws in Antituberculosis Administration in England.—Imperfections under the Act of 1911 as applied to tuberculosis, are (1) noncoöperation of the general practitioner; (2) lack of experience with tuberculosis on the part of medical officers of health; (3) the limited understanding of after-care. —*Gaps and Flaws in the Public Health Administration of Tuberculosis, Jane Walker, Tubercle, August, 1927, viii, 512.*—(*B. H. D.*)

Protective Inoculation with "BCG."—From July 1, 1924, to December 1, 1927, 52,772 infants were vaccinated at birth, in Paris and its environs. Of this number, 5,749 were born of tuberculous mothers or lived in contagious surroundings, and each of them has been carefully observed. Of the latter, 3,808 have been vaccinated less than one year previous to December, 1927, and there have been 118 deaths among this group. Thirty-four died presumably of tuberculous disease. The general mortality from all causes among those vaccinated and in contact with tuberculosis was 3.1 per cent, and the tuberculosis mortality 0.9 per cent. Among the nonvaccinated, with or without contact with tuberculosis, the general mortality was 8.5 per cent and the tuberculosis mortality 24 per cent. Nineteen hundred and forty-one infants (contacts) have been vaccinated from one to three years. There have been 21 deaths and only 4 due to tuberculosis. The general mortality in this group from all causes was 1.2 per cent and the tuberculosis mortality 0.2 per cent. Of this group, up to December 1, 1927, 917 were from two to three and one-half years of age. None of them are suffering from tuberculosis, so that the tuberculosis mortality is zero. Antituberculosis immunity produced by the vaccine lasts much longer than was expected at first. It seems that the immunity persists for at least five years, the period when the children are most susceptible to tuberculous infection. The figures prove that vaccination by *BCG* is harmless and that its efficacy can no longer be doubted.—*Vaccination préventive des nouveau-nés contre la tuberculose par le BCG, Statistiques et résultats du 1er juillet 1924 au 1er Novembre, 1927,*

A. Calmette, Meeting, Acad. d. Méd., January 10, 1928, reported in Prog. Méd., January 21, 1928, no. 3, 114.—(U. E. Z.)

Protective Inoculation with "BCG."—This presentation before the *Wiener Gesellschaft für Mikrobiologie* is a reiteration of the historical development, the theoretical foundations, the technique, and the statistical results of Calmette's method of immunization. Although the Danish statistics by Kjer-Petersen are mentioned, according to which the tuberculosis mortality during the first year of life of infants in tuberculous coresidence, is 7.7 per cent, Calmette maintains that in France it is as high as 24 to 32.5 per cent. Autopsy records of vaccinated children have not been published because "nothing particular" was found. In response to the criticism of his statistical methods, Calmette extended an invitation to his critics, to study his statistical reports in the Pasteur Institute. Some authors doubt whether tubercle bacilli are resorbed by the intestinal mucosa. Boquet has shown in guinea pigs that paratubercle bacilli are demonstrable in the heart's blood three to forty-eight hours after peroral administration. It is claimed that there are "no relations whatsoever" between tuberculin allergy and resistance against reinfection. This is said in answer to those workers to doubt the effectiveness of the vaccination, because only a small percentage of children develop a tuberculin allergy. "Parasitism" alone, without symbiosis, produces protection. By parasitism is meant the mere presence of tubercle bacilli in the body without cellular response of the latter; by symbiosis is meant the formation of "tuberculosis cells" as response to tubercle bacilli. Parasitism insures protection without allergy; symbiosis causes allergy. A reversion of the *BCG* strain to virulence is very unlikely to happen. Petroff's experiments, which alleged such an occurrence, have been repeated in the Pasteur Institute with negative results. The effectiveness and harmlessness of the *BCG* vaccination has been proved on 150,000 infants.—*Schutzimpfung mit B. C. G. gegen Tuberkulose, A. Calmette, Wien. klin. Wchnschr., May 24, 1928, xli, 725.—(M. P.)*

Protective Inoculation with "BCG."—Nobel, from the pediatrics clinic in Vienna, has warned the practitioner not to use the *BCG* vaccine, because, in his opinion, this vaccine may cause lethal infections in guinea pig. These experiments will be discussed in a later communication. It has been proved by various workers that the *BCG* vaccine, even in large doses, never causes any more serious disease than swelling of lymph nodes and localized cold abscesses. The innocuousness of the vaccine for infants has been demonstrated in large series. From July, 1924, to September, 1927, 52,777 infants were immunized in France. Many more infants were treated in other countries; in Indochina alone the number was 33,000. The records of 1,891 French children are available; they are now one to three and a half years of age and constantly in contact with bacilliferous members of their family. Only 5, that is 0.2 per cent, have died of probably tuberculous processes. Of the 1,891 children, 898 are between two and three years old; none of these has died of tuberculosis. This demonstrates that the *BCG* microörganism is harmless for a period of at least three years. There is another group of 3,808 children who have been vaccinated less than a year ago. The tuberculosis mortality in this group is 0.9 per cent. The total mortality during the first year of life in France is 8.5 per cent of all living born children, whereas the analogous figure for the vaccinated group is 4.2 per cent. The reduction of the total mortality is considered to be caused by the vaccination. Immunization by one subcutaneous injection is not deemed advisable in communities in which tuberculosis is endemic.—*Zur Frage der Impfung der Neugeborenen gegen Tuberkulose mit B. C. G., A. Calmette, Wien. klin. Wchnschr., January 5, 1928, xli, 14.—(M. P.)*

Subcutaneous Protective Inoculation with "BCG."—Subcutaneous administration of *BCG* permits one to prove definitely the harmlessness of the vaccine, and its administration to older individuals. After subcutaneous injection a small abscess is formed, which perforates the skin about two months after the injection; after a few weeks the fistula heals spontaneously, leaving finally no mark. The injection of larger amounts causes adenopathy (it is not stated whether local or generalized). Four to five weeks after vaccination, the Pirquet test becomes positive. Subcutaneous vaccination should be done only in noninfected children. By the end of 1927, 17 children were so treated. One child died of "meningitis" five weeks after vaccination; an etiological diagnosis was not obtainable. Another child died of measles complicated by bronchopneumonia, seventeen months old. A third infant developed "bronchitis" and died in convulsions, ten months after vaccination. None of these children was autopsied; in none were accurate clinical

records available. The rest of the children are well. Other investigators report favorable results with the subcutaneous vaccination. Vaccinated individuals must be protected from sources of infection for the first four weeks; the appearance of tuberculin allergy, in apparent disagreement with Calmette's opinion, indicates probably the development of immunity.—*Die Impfung gegen Tuberkulose bei subkutaner Einspritzung des B.C.G., B. Weill-Hallé, Wien. klin. Wchnschr., May 24, 1928, xli, 728.*—(*M. P.*)

Subcutaneous Protective Inoculation with "BCG."—Sixteen infants exposed to tuberculosis were vaccinated by subcutaneous injections of *BCG* vaccine. Some were vaccinated in 1924 and others in 1918, with doses varying from 1/16 to 2 mgm. Three of the patients have died, but whether or not tuberculosis was the cause is not known with certainty. The effects following the injections are very benign. The results obtained by this method warrant its more general use.—*La prémunition du noveau né contre la tuberculose par l'injection sous-cutanée de BCG, Weill-Hallé, Meeting, Acad. de Méd., January 3, 1928, reported in Prog., Méd., January 14, 1928, no. 2, 64.*—(*U. E. Z.*)

Virulence of "BCG."—In continuation of previously reported work, 5 guinea pigs received 10 mgm. *BCG* by mouth; one animal died spontaneously thirty-eight days after infection and showed pulmonary tuberculosis; aspiration may have occured in this animal. All the other animals showed no tuberculous lesions at autopsy. A guinea pig received 10 mgm. of the original vaccine intraperitoneally; it was killed eighty-five days later, and showed peritoneal adhesions. Another animal treated with 10 mgm. of a subculture of *BCG* showed typical tuberculosis, sixty days after infection. Vaccinated animals were not immune to a subsequent virulent infection, but most of them lived considerably longer than the controls.—*Tuberkuloseimmunität und Schutzimpfung nach Calmette mit B.C.G., E. Nobel, Wien. klin. Wchnschr., June 7, 1928, xli, 798.*—(*M. P.*)

"BCG" Not Harmless.—The author has shown in coöperation with Chiari and Sole that some animals inoculated with the *BCG* vaccine develop progressive tuberculous lesions, that tubercle bacilli can be isolated from the lesions, and that the recovered microörganisms are virulent. Gerlach, it is pointed out, had similar experiences. A previous warning against the general use of the vaccine is emphatically repeated. Evidence to show that the vaccine is not innocuous is presented from Calmette's recent book: one out of ten infants died of tuberculous meningitis following subcutaneous immunization; other examples from the same source are quoted. The statistical proof of the efficiency of the method is not convincing, since parents who seek or allow immunization for their infants are hygienically educated and careful. Calmette's statement that "figures suffice to convince the greatest sceptics" is refuted.—*Ueber die Tuberkuloseschutzimpfung nach Calmette, E. Nobel, Wien. klin. Wchnschr., January 19, 1928, xli, 87.*—(*M. P.*)

General Immunization with "BCG" Discountenanced.—The previously reported experiments, showing that this strain can produce specific but benign lesions, are summarized. The more recent literature on this subject is quoted, and the conclusion is reached that, although the *BCG* strain is apparently harmless, the general application to infant immunization, at the present time, would be premature. It is important to obtain necropsy reports on immunized infants who died of intercurrent diseases.—*Zur Frage der Apathogenität des BCG-Stammes zur Schutzimpfung nach Calmette, R. Kraus, Wien. klin. Wchnschr., March 29, 1928, xli, 441.*—(*M. P.*)

Reliability of Calmette's Vaccine.—In previously reported work, it was shown that the *BCG* vaccine produces typical tuberculous tissue, which, however, always disappears after some time, which does not make the animal sick, and which does not give rise to spreading lesions. Since this was reported, essentially the same findings were obtained by several other workers. Transplantation of organs with lesions caused by the *BCG* bacillus never caused tuberculosis. The immunizing effect has been demonstrated on various animals. The statistical reports on human infants from France, Belgium, Roumania and Russia, are very encouraging. It is, however, not known as yet how long the immunity caused by this vaccination will last, and whether revaccination is desirable and safe. This method of vaccination should not yet be used by the practitioner, since further studies and experiments are necessary. The production of the vaccine must always be carefully supervised and preferably centralized according to the methods used at the present time by Calmette.—*Zur Frage der Zulässigkeit der präventiven Schutzimpfung gegen Tuberkulose nach Calmette, R. Kraus, Wien. klin.*

Wchnschr., December 1, 1927, xl, 1508.—(M. P.)

Pathological Changes Caused by "BCG."—Four weeks after the intraperitoneal injection of 15 mgm. *BCG* into a guinea pig, the omentum is shrunken, and contains numerous yellowish nodules; similar formations are found on the intestinal serosa. The liver and spleen, of approximately normal size, show histologically many small foci of necrosis surrounded by lymphocytes and a few epithelioid cells. After eight weeks these foci resemble more typical tubercles, with a markedly exudative character. All foci contain many acid-fast rods. An animal, which had been vaccinated with 15 mgm. *BCG*, was infected with 1 mgm. of a virulent bovine bacillus; it died of generalized tuberculosis two hundred and forty-six days after the infection. The liver showed marked cirrhosis, a not unusual finding in animals succumbing to a chronic tuberculous infection. The differences in the anatomical alterations caused by *BCG* and by ordinary tubercle bacilli are as follows: In the *BCG* animals the liver and spleen are less infected; histologically, the centre of the foci shows granular detritus instead of coagulation necrosis, and marked exudation.—*Pathologisch-anatomische Veränderungen bei mit B.C.G. geimpften Tieren, H. Chiari, Wien. klin. Wchnschr., June 7, 1928, xli, 798.—(M. P.)*

Protective Inoculation of Adults with "BCG."—These studies were carried out by Heimbeck and Scheel in the Ulleval hospital training-school for nurses at Oslo, Norway. Fifty-two per cent of the pupils entering the school did not react to tuberculin. Twenty-three and seven-tenths per cent of this group developed tuberculosis during their stay in the hospital. Of those giving a positive reaction, only 2.6 per cent developed the disease. It was then decided to give to the next group presenting negative responses to tuberculin, 0.05 mgm. of *BCG* vaccine by subcutaneous injection. In 1927, among 56 student nurses whose reaction to tuberculin was negative, 44 were vaccinated and 12 refused. At the end of one year, four of the twelve who refused vaccination were stricken with tuberculosis and the 44 who were vaccinated remained well. It is legitimate therefore to vaccinate with *BCG* any individuals, at any age, who are apparently well and fail to react to tuberculin.—*La réaction tuberculinique et le vaccin BCG chez les adultes, A. Calmette, Meeting Acad. de Méd., January 3, 1928, reported in Prog. Méd., January 14, 1928, no. 2, 67.—(U. E. Z.)*

Protective Inoculation with "BCG" Criticized.—The majority of fatal diseases to-day are the consequence of the natural degeneration of the tissues in old age, but tuberculosis overcomes its victims chiefly at an earlier period. According to English statistics more than one-half of women dying around the age of twenty die of tuberculosis. At puberty, sooner in women, later in men, the lung becomes particularly poor in defensive power against the tubercle bacillus. The most important causes of death in chronological order, are as follows: congenital malformations, bronchitis, pneumonia, acute infectious diesases (measles and whooping cough in the third, scarlet fever and diphtheria in the sixth year). From the eleventh to the forty-sixth year, tuberculosis is a more frequent cause of death than any other disease. Later, cancer and still later, cardiac and vascular diseases are most frequent. From the rapid decline of tuberculosis in North America and in German towns, it may be anticipated that in a few decades tuberculosis will be one of the rare causes of death. The reduction of the tuberculosis mortality must be attributed to the isolation of open cases and to the maintenance of good conditions of nourishment. The prevention of infection is particularly important for young children, while older children may profit by the immunizing action of infection, if a proper method be elaborated. An immunization of children during the first years of life by active infection is dangerous and not promising. In Calmette's method there are two new and questionable factors. His strain is, according to several workers, attenuated but not completely harmless. After oral administration, allergy is usually not produced. Calmette's assumption that immunity is produced by "parasitism" without allergy is a "thoroughly improbable" one. The only proof for the statement that the tuberculosis mortality among 75,000 "vaccinated" children was smaller than according to the expectation rests on statistical errors as shown by Rosenfeld and Götzl. When the *BCG* bacillus actually gains entrance into the body, as is the case in Weill-Hallé's subcutaneous injection, a typical inoculation tuberculosis develops, whose further developments cannot be clearly understood from the reports. The immunization of humans with *BCG* cannot be approved of.—*Allergie nach Lebensalter und Geschlecht bei der Tuberkulose, C. Pirquet, Wien. klin. Wchnschr., June 7, 1928, xli, 798.—(M. P.)*

Protective Inoculation of Cattle with "BCG."—The original *BCG* strain was planted on ox-bile-potato in 1908. Its viru-

lence was tested at intervals; after 34 transplants, the bacilli were still pathogenic for guinea pigs and rabbits, but not any more for cattle. After 198 transplants (1919) 1 mgm. was apathogenic for small laboratory animals, 5 mgm. for horses, and 100 mgm. for cattle. After 230 transplants (1921) the bacillus remained avirulent, but still formed tuberculin on ordinary glycerol-water-potato. Cattle injected subcutaneously with 50–100 mgm. bacilli develop hard local infiltrations of long duration. They are immune to 5 mgm. virulent bacilli which kill controls in thirty to fifty days. They are resistant for at least eighteen months against spontaneous infection. On a farm with endemic cattle tuberculosis, 70 head of young cattle were vaccinated during the last six years; the vaccination was repeated once every year. Twenty animals had tuberculous mothers; all were fed on raw milk which was obtained from cows 41.7 per cent of which were tuberculous. The vaccinated animals were isolated immediately after birth. Thirty of these animals were slaughtered in January, 1927; none showed tuberculous lesions. Up to the first of March, 1928, 15,806 vaccinations and revaccinations were performed; no ill effects were observed. It was ascertained in experiments with virulent bacilli that bacilli may multiply in the lymph nodes without causing tissue alterations: a stage of true parasitism which does not cause tuberculin allergy. The same mechanism underlies the protection caused by *BCG.—Prophylaxe gegen Tuberkulose-Infectionen bei Rindern mittels B.C.G., A. Guérin, Wien. klin. Wchnschr., May 24, 1928, xli, 731.—(M. P.)*

Criticism of Calmette's Statistics.—This study is based on the following data: From the 17 tuberculosis dispensaries the names of all families were obtained in which one or more patients were known to have open tuberculosis. Only children up to six years of age were considered; to these were added, for statistical reasons, all children born in 1921 who had died in 1922. Of all children who had died in hospitals, the autopsy reports were obtained; of all children who had died at home, the death certificates were considered. The number of residential units (*Wohngemeinschaften*) with cases with open tuberculosis was 1,885, with 1,113 children six years of age or less. Of these children, 142 died, 78 during the first year of life. Of 94 children, autopsy records were available, 51 of these of children during the first year of life. Of 36 children the death certificates were used, 17 of these of infants up to one year of age. In 13 instances, the cause of death could not be ascertained; 11 of these infants died during their first year of life. The infant mortality in tuberculous coresidence was 7 per cent. Calmette found in a group of 3,808 vaccinated children from tuberculous surroundings 3.1 per cent. Since, however, these infants have not been observed a full year, this figure, according to the statistical criticism by Rosenfeld and Greenwood, must be multiplied by two in order to obtain the actual death-rate. The tuberculosis mortality during the first year of life was 2.9 per cent, and 3.9 per cent if all cases of unknown cause of death are counted as tuberculosis. This is about eight times the total tuberculosis mortality during the first year of life in Vienna. The tuberculosis mortality during the first year of life in Calmette's 3,808 vaccinated infants was seven times the same figure for the whole of France (using Calmette's uncorrected data). Infants in tuberculous surroundings in Vienna, and infants under the same condition, but vaccinated, in France, have about an equally greater likelihood to die of tuberculosis than their respective compatriots. In Calmette's series, of 34 infants who died presumably of tuberculosis, 30 died of meningitis, 2 of miliary tuberculosis, 1 of bronchopneumonia; autopsy findings are published of only two cases; in none of the 84 infants who died of nontuberculous diseases, have necropsies been reported. This is a serious lack, especially if the reported causes of death are considered, namely, athrepsia, bronchopneumonia (grippe and pertussis), convulsions, pertussis, "congestion pulmonaire."—*Das Schicksal der Kinder aus offentuberkulösen Familien, A. Götzl, Wien. klin. Wchnschr., June 7, 1928, xli, 804.—(M. P.)*

Criticism of Calmette's Statistics.—This report by the chief of the Statistical Service at the Health Department in Vienna is a purely statistical investigation into the statistical methods employed by Calmette, to prove the efficiency and harmlessness of the *BCG* vaccine. Calmette's proof consists in the statement that both the total mortality and the tuberculosis mortality of vaccinated children born by tuberculous mothers are smaller than those of nonvaccinated children of the same age, and particularly of those born of tuberculous mothers. His proof is presented for children during the first year of life and after the first year of life. Since the method of proof in both groups is essentially the same, the investigation is limited to the reports concerning children during the first year of life. Calmette claims to obtain immunization, which means prevention of disease. His figures, however, are based entirely on mortality and not morbidity

statistics. There are no data in Calmette's work on the frequency of tuberculous disease in the surviving vaccinated children. In some places the figures for comparison are chosen in such a way that they must be favorable for Calmette's claim *a priori*. This is, for example, the case in his hospital statistics and in some of the vital statistics, which are taken from an earlier date than the statistics on vaccinated children. Since the tuberculosis mortality has very materially decreased during the last twenty years, the difference in date is of obvious importance. In the mortality statistics, death-rate and death-quota are confused. The former term is the number of deaths calculated for hundred living persons, the latter term is the number of specific deaths calculated for hundred deaths. Calmette compares, for example, the death-quota for infants in the department Seine-Inferieure, with the death-rate for infants for the whole of France. The death-quota is not suitable to determine the frequency of a disease, since it changes independently of the actual frequency of this disease on account of fluctuations in the frequency of other diseases. Calmette uses the quota figures to determine the frequency of death by tuberculosis during the first year of life. In addition, he makes the statistical error that he takes the arithmetical mean of a number of quotas without considering the absolute figures from which these quotas have been calculated. An example shows the fallacy of this procedure: In a hospital there are a thousand deaths of infants with 10 deaths by tuberculosis, the quota is 1 per cent; in another hospital there are a hundred deaths of infants with 10 deaths by tuberculosis, the quota is 10 per cent; according to Calmette, the mean quota would be 5.5 per cent, the actual quota, however, is $\frac{100\ (10+10)}{1000+100} = 1.8$ per cent. The death-quotas from hospitals are particularly insignificant, since the frequency of a disease does not permit to draw any conclusion in regard to the frequency of this disease in the general population. Calmette quotes Hamburger as saying that in a children's hospital in Vienna 15.4 per cent of all infant deaths were due to tuberculosis. During this same time the quota of tuberculosis in all infant deaths in Vienna was 4.7 per cent. According to Calmette, the average of the quota is 22 per cent. The quota is according to Weinberg, 2.12 per cent in Stuttgart; according to Matare, 2.57 per cent in Munich; in England, 1.82 per cent; in Germany 1.67 per cent; in Italy, 1.42 per cent. All these new figures are greatly different from Calmette's 22 per cent. Calmette has made inquiries in the dispensaries in France, to show that the tuberculosis mortality of vaccinated children is much smaller than that of other children, all born of tuberculous mothers. However, only 99 dispensaries sent usable answers, while the total number of dispensaries at this time was 500. The inquiry was made in 1925, and the causes of death had to be determined retrospectively; in no case was the diagnosis confirmed by autopsy. Calmette claims a tuberculosis mortality of 24 per cent for infants during the first year of life and born of tuberculous mothers. This figure is based on data received from the dispensaries enumerating the causes of death of all children born in the year 1922, and covering a period to the first of January 1925. This statistic includes not only deaths during the first year of life. The tuberculous mothers of the dispensaries and the tuberculous mothers of the maternity wards are not comparable groups. The statistics of nonvaccinated children are based on the former, the statistics of vaccinated children on the latter. Of all tuberculous mothers who had given birth to children in the year 1922, 54 per cent had died by January 1, 1925, indicating in a large number far advanced lesions at the time of delivery. Calmette has not published any mortality statistics of the tuberculous mothers in the maternity wards. The two groups of mothers are socially different, those in the dispensaries being undoubtedly in poorer conditions. No statistics are given about the percentage of legitimate and illegitimate children in each group. The dispensaries reach tuberculous mothers frequently, only after the child is diseased. The tuberculous mothers should be divided into two groups, namely, those with healthy and those with diseased children. Each group should be subdivided into two subgroups, namely, those who were already under care during pregnancy and those who were not. Mothers of the last subgroup, who have tuberculous children, reach the dispensaries; the same mothers with healthy children do not. The entire subgroup with healthy children is, therefore, not known to the dispensaries, and a large number of healthy children are, therefore, excluded from Calmette's statistics for the infant mortality of tuberculosis. The mortality appears higher than it actually is. Weinberg has shown that children of tuberculous parents have not only a higher tuberculosis mortality, but a very much higher total mortality for obvious reasons. If the same consideration is used on Calmette's statistics, the total mortality of infants, born by tuberculous mothers, would be

unbelievably high. There is then no doubt that the figures for the mortality of nonvaccinated children is altogether much too high; on the other hand the mortality figures for vaccinated children are too low. The vaccination is not done on the day of birth; therefore the mortality of the first or the first few days is not considered. This causes a considerable error. In England in 1924 to 1926, 13.94 per cent of all deaths during the first year of life occurred on the first day of life. The same percentage for the first week was in Vienna in 1891 to 1900, 16.8 per cent; in Prussia, in 1882 to 1900, 13.9 per cent; in England, in 1924 to 1926, 29.21 per cent. Poor risks were excluded from vaccination. Calmette says, "*plusieurs accoucheurs font vacciner systématiquement tous les enfants qui viennent au monde en bon état de santé apparent.*" This explains the astonishing fact that out of 159 deaths during the first year, there were only 10 per cent during the first and second month. Everywhere in the world this percentage for the first two months is a multiple of 10. In Austria, in Vienna, in Prussia, in Italy, and in England, it is anywhere from 30 to 44 per cent. A still more significant mistake is introduced by an error in the statistical method. According to Calmette, of 3,808 children vaccinated within a year before the first of December, 1927, 118 died, making an infant mortality of 3.1 per cent as compared with an infant mortality of 8.5 per cent for the whole of France. The two figures cannot be compared because these vaccinated children have not all been observed for a full year. This study should have been continued until the first of December, 1928. In this case the number of deaths would undoubtedly have been higher, probably doubled. It is then most questionable whether the mortality of vaccinated infants born by tuberculous mothers is smaller than the total infant mortality in France. All these methodical errors explain the astonishing fact that the mortality, exclusive of tuberculosis of all French infants is 8.37 per cent, and that of infants born by tuberculous mothers and vaccinated is only 2.2 per cent. It could not possibly be assumed that the *BCG* vaccination should protect against other diseases than tuberculosis. In addition to all this the likelihood of diagnostic errors must be considered, since only very few autopsy reports have been published. Convincing statistics should be built on the following principles: *1:* The number of vaccinated infants who do not develop tuberculosis. *2:* How many infants were excluded from vaccination, because they died too soon, because they were apparently in poor health, and because of parents refusing permission to vaccination. *3:* What is the condition of health of the tuberculous mothers; how many of them died within definite periods after delivery? *4:* What is the mortality of vaccinated children of nontuberculous mothers? *5:* Grouping of the infant into legitimate and illegitimate children, with data on the care of the children at home, in the Oeuvre Grancher and dispensary care. *6:* The mortality of infants should be calculated only after each infant has been observed for a full year. Since it is almost impossible to obtain strictly comparable groups of vaccinated and nonvaccinated children, the tuberculosis mortality of all vaccinated children should be compared with the tuberculosis mortality of all nonvaccinated children under the presumption that the percentage of tuberculous parentage is approximately the same in both groups. Such data are not available at the present time, because the vaccinated children of nontuberculous mothers have not been used in the statistics. If the vaccination has immunizing effect, it must be expected that children in tuberculous coresidence are made by it equal to children in nontuberculous coresidence; in other words, the vaccinated infants should not have a greater tuberculosis mortality than all nonvaccinated children regardless of their coresidence. If Calmette's statistics are analyzed from this point of view, the following results are obtained: According to Calmette 0.13 per cent infants died of tuberculosis in the whole of France in 1925. This figure is similar to the analogous figures in England, United States, Netherlands, Prussia and Switzerland. The tuberculosis mortality of 3,808 vaccinated children is 0.9 per cent, that of the children vaccinated between the first of January and thirty-first of July, 1925, is higher, that is, the tuberculosis mortality of this group is at least seven times as high as that of all vaccinated and nonvaccinated infants in France. The conclusion is reached that Calmette's statistics contain grave methodical errors, and that even without the correction of these errors an immunizing property of the vaccine has not been proved by the statistics.—*Der statistische Beweis für die Immunisierung Neugeborener mit B.C.G., S. Rosenfeld, Wien. klin. Wchnschr., June 7, 1928, xli, 800.*—(*M. P.*)

Route of Tuberculous Infection.—In opposition to the view held by Huebschmann, that the pulmonary apices are not infected aerogenically, it is pointed out that aerogenic primary *Affekts* of the apices occur, even though rarely, and three cases are

reported. Anthracosis of the pulmonary apices also contradicts Huebschmann's view. The rarity of apical primary *Affekts* is explained in that the virus localizes in the most active pulmonary parts during respiration, which are not the apical parts. In the allergic individual, on the other hand, only the more poorly functioning part, the pulmonary apices, become diseased, in which it is immaterial whether the bacilli arrive by the aerogenic or haematogenous route. Both routes are possible, the former being more frequent. A large number of the old foci remain obsolete, and the question still remains in how far exacerbations can actually lead to phthisis. Finally, metastases, in cases of bovine phthisis, should be more frequent, and yet there are only three undoubted cases reported.—*Zur Frage der Infektionswege, H. Beitzke, Ztschr. f. Tuberk., 1927, xlvii, 18.*—(*H. J. C.*)

Route of Tuberculous Infection.—Huebschmann points out the unquestioned finding of the tubercle bacillus in the circulating blood, even in mild and clinically latent cases of tuberculosis. These bacilli from old lesions and from subclinical new infections are at least partly infectious. The paucity of metastases in the tertiary stage does not speak against the virulence of these bacilli but rather for the immune status of the body. According to observations made on the primary *Affekt* it is to be deduced that tubercle bacilli do not frequently reach the apices. Animal experiments cannot be drawn upon in any way to aid in this question. Fresh apical lesions, which undoubtedly must be associated with the primary complex, and meningitis have been observed eight times by the author. Haematogenous reinfection remains the predominant form, while the exogenous reinfection is rare.—*Bemerkungen zu dem Artikel von H. Beitzke "Zur Frage der Infektionswege," P. Huebschmann, Ztschr. f. Tuberk., 1927, xlvii, 23.*—(*H. J. C.*)

Transient Contact and Tuberculosis.—The importance of transient contacts in the spread of tuberculosis is discussed. Their exact significance cannot be determined, as no figures on this are at present available. The greatest danger from them exists for children.—*Tuberkulose und fahrendes Volk, F. Reichardt, Zeitschr. f. Tuberk., 1927, xlviii, 452.*—(*H. J. C.*)

Bovine Tubercle Bacilli in Human Sputum.—Bovine tubercle bacilli are rarely found in the sputum of patients with pulmonary tuberculosis. Park and Krumwiede collected statistics, and found only two cases of undoubted bovine type infections in 680 cases of pulmonary tuberculosis. Griffith isolated bovine tubercle bacilli from three cases out of 275, and pointed out that precautions must be taken to exclude contamination of sputum with bacilli from milk and butter taken by the patient. Munro and Cummings discussed the determination of the bovine type, and relied on the intravenous inoculation of 0.01 mgm. of bovine bacilli into rabbits weighing 1000 to 1500 gm. This invariably produced generalized tuberculosis fatal in thirty days, while the human type never killed within ninety days. A table taken from the *Report of Proceedings of the National Conference on Maternity and Infant Welfare* held in London in 1927, shows that bovine bacilli are rarely obtained from pulmonary lesions, that they are frequently obtained from lymph-node lesions, and that by selection according to age and lesions a distinct age and tissue incidence for bovine infections can be shown. In the past five years bovine tubercle bacilli were isolated from the sputum of five patients at Glenlomond (Scotland). Controls of the virulence were done in all cases by Tulloch of University College, Dundee, and by Griffith, at Cambridge. The five case reports are given and the results of the virulence tests on the microörganisms isolated were as follows: *Case 1:* 0.01 mgm., injected intravenously, killed a rabbit on the 35th day, and 10 mgm. subcutaneously on the 63rd day. The generalization of the disease in both rabbits was short of that usual for infection with bovine virus. *Case 2:* 0.01 mgm. intravenously failed to kill one rabbit after fifty days, the second died after forty-six days and a third died on the eighteenth day after 1 mgm. was injected intravenously. The virulence of this microörganism was unusually low for a bovine virus. *Case 3:* This organism seemed eugonic, but 0.01 mgm. injected intravenously produced lesions much in excess of that usual for a eugonic virus. Growth from the kidney of this rabbit gave a dysgonic virus typically bovine in growth and virulence. *Case 4:* 0.01 mgm. intravenously killed a rabbit after thirty-five days. This virus had the full virulence of the bovine type. *Case 5:* Two microörganisms were isolated, one from an abscess and the other from sputum; both proved to be similar bovine types. Why bovine tubercle bacilli are so rarely found in sputum cannot be satisfactorily answered at present. Bovine bacilli, and once both types, were isolated from the tracheobronchial lymph nodes of 8 out of 20 children investigated at Glenlomond. These microörganisms must have traversed

the lungs before they reached the tracheobronchial nodes, and in most instances there was plain evidence at postmortem that the route of infection was by the abdominal lymph nodes. If one accepts the allergic theory of chronic pulmonary tuberculosis, that is, that chronic ulcerative tuberculosis is the result of superinfection, then such a chronic process must have been going on in lungs of all five cases. In case 1 the bacilli were numerous, and this was the only one that showed the usual picture of chronic adult pulmonary tuberclosis. In the other four cases bacilli were always scanty, and clinically the lesions were more like root-spread tuberculosis. In three of the cases the X-ray films showed the apices clear. There is probably a difference in the way tissues respond to the bovine and human types. It is quite possible that superinfection by the human type leads to a more violent allergic reaction and more breaking down of tissues, which would only occur with much larger numbers of bovine tubercle bacilli. The allergy occasioned by a previous infection can protect against superinfecton by the bovine type but breaks down before the human.—*Bovine Type Tubercle Bacilli from Sputum in Pulmonary Tuberculosis. An Account of Five Cases. W. T. Munro, with an Addendum by A. S. Griffith, Lancet, February, 25, 1928, ccxiv, 384.*

Addendum: —The findings of Munro on the type and virulence of the bacilli isolated from four of the above cases were confirmed by the author.—*Observations on the Character of the Tubercle Bacilli from Four of the Above Cases, A. S. Griffith, Lancet, February 25, 1928, ccxiv, 385.*—(*F. G. P.*)

Constitutional Factor in Tuberculosis.—Up to the beginning of the bacteriological era the notion of terrain dominated human pathology. Later, the new microscopic observations led to the ignoring of facts established by irrefutable observation. For the past fifteen years Sergent has vigorously defended the importance of "nonspecific humoral qualities," independent of bacillary impregnation but capable of modifying its consequences. The tubercle bacillus, like other microörganisms, manifests particular affinities, shown experimentally in animals and in cultures. It is not unreasonable that individuals should differ in their sensitiveness to tuberculous infection. Both the chemical and physical characters of the culture media influence bacillary growth and development. Also, all animals are not equally sensitive, as witness guinea pigs and rabbits, cows, swine, sheep and goats (relatively resistant), and Metchnikoff has found some entirely refractory species. It is impossible to separate terrain from allergy. The tuberculosis of the infant most closely parallels experimental tuberculosis. Bernard and Debré have clearly shown the importance of virulence and repetition and size of dosage. But without mistaking the value of infection, it seems clear that tuberculosis is in part governed by other factors. Wright and Lewis, in experimental studies on 30,000 guinea pigs, have established the fact that in 30 per cent of cases a definite hereditary influence exists. In a later study of 5,629 persons in 214 families they concluded that the transmission of the "tuberculous diathesis" is not a fiction. In the service of *La Charité* the records of 1400 tuberculous persons were analyzed by Sergent, Turpin and Vidrasco, some of these being private patients or those from sanatoria, and these were thought to show a hereditary influence in about the same proportion. An attempt was then made to correlate susceptibility or refractoriness with physiological conditions, especially the vegetative-endocrine system. Alimentary deficiency as a predisposing factor was well demonstrated by German and Austrian experiences in the War. Intoxications other than that of alcohol are less clearly factors. Clinicians generally agree that measles, grippe, whooping-cough and diphtheria may weaken the defenses against tuberculosis. The rôle of typhoid fever is not so clearly established. Pneumonia may coëxist with active tuberculosis, as shown by Menétrier in 31 of 181 autopsies. Syphilis plays a more complicated rôle. Secondary syphilis undoubtedly has an anergizing effect favoring the development of tuberculosis. Rivalier and Lelong have found the cutireaction to tuberculin reappeared after two to four weeks of arsenical treatment. Long-standing syphilis, on the other hand, appears often responsible for a torpid fibrosing tendency in a coëxisting tuberculous process. Leukaemic patients seem prone to develop disseminated nodules, without caseation or giant cells but containing numerous tubercle bacilli. Recent experiments of Harde and Focsa with cancer and tuberculosis indicate that the former favors implantation of the latter but not *vice versa*. Are there constitutional humoral differences favoring or opposing tuberculosis? The association of Basedow's thyroid syndrome and tuberculosis is not uncommon, and thyroid therapy has been known to accelerate tuberculosis. The basal metabolism in tuberculous patients is normal in the apyretic, increased in the febrile. Calcium metabolism has long been the subject of discordant opinions. Deter-

mination of the calcium balance is most difficult, owing to the multiplicity of channels of absorption and elimination. However, empirically, remedies which retard the evolution of tuberculosis also increase the calcium content of the body. An acid medium appears to favor the evolution of a tuberculous process, and this may explain its unfavorable course in diabetics. Further progress of our knowledge of terrain appears to require more precise means of investigation and more careful collection of data.—*Les facteurs de terrain, autres que l'allergie, dans l'infection tuberculeuse, E. Sergent and R. Turpin, Rev. d. l. Tuberc., April, 1927, viii, 200.*—(*A. P.*)

Atmospheric Conditions and Acute Respiratory Infections.—While it is generally conceded that the incidence of acute respiratory infections is greater in winter than summer, the possible relationship between daily climatic conditions and these infections has been neglected. The alleged frequency of respiratory infections among nurses in training and the opportunity to correlate these points led to this study. Brown was able to determine with considerable accuracy the date of onset of respiratory infections sufficiently severe to be reported. Owing to close supervision of these girls a larger proportion of total infections would be included than in the community at large. This study included simple coryza, acute rhinitis, pharyngitis, laryngitis, tonsillitis and bronchitis. The young women (except a few of the permanent personnel) were between 18 and 30 years of age, living under fairly uniform conditions. During 2 five-month periods of observation they averaged 148 in number, with 101 cases for study. Roughly one-fifth in each period were new, the entering class of student nurses. All were housed in single rooms in a four-story building, in which heating conditions were uniform and remarkably constant. Room temperatures were read twice daily in the rooms of those nurses ill and continued for three days after their return to work. The temperatures of the wards and operating rooms were charted daily and carefully regulated. General weather conditions were obtained from monthly meterological summaries, from the local Weather Bureau station of the U. S. Department of Agriculture. The charts were condensed by showing ten-day averages instead of daily figures. In the first section a fairly level curve is shown with but slight variation in incidence of respiratory infections until the eleventh period, when a peak of increased incidence covered a thirty-day period in April. The following year there were three lesser peaks between January and March. In both sections, the incidence rises as, or just before, the mean temperature. Closely correlated with the incidence of respiratory infections in a reverse way is the number of hours of sunshine. No relation could be demonstrated between the occurrence of infections and location of nurses' rooms, and contact between successive cases presented an almost exact counterpart of theoretical chance distribution. The nurses show only one-sixth the incidence of respiratory infections among the general population, that is, about one-third per person per year, compared with two.—*The Relation of Acute Respiratory Infections to Atmospheric Conditions, C. L. Brown and G. P. Grabfield, New England, J. M., May 13, 1928, cxcviii, 679.*—(*A. P.*)

Rain-Bearing Winds and Early Phthsis.—Three hundred and six cases of early phthsis at the County Sanatorium of Derby, England, were studied to determine the effect of strong prevalent rain-bearing winds upon the course of the disease. It was found that patients with early phthsis die more often and recover more rarely when exposed to strong prevalent rain-bearing winds than when residing in shelter from them.—*Rain-Bearing Winds and Early Phthsis in Derbyshire, W. Gordon, Brit. Med. J., March 3, 1928, no. 3504, 337.*—(*W. I. W.*)

Pregnancy and Pulmonary Tuberculosis.—The puerperal state is an ill-omened period for the tuberculous woman. Many differences of opinion exist concerning the effect of pregnancy in the tuberculous, and this is largely due to the fact that many phthisiologists base their conclusions upon a too small number of cases and most obstetricians do not make a careful enough study of the cases they observe. Bar classified pregnant tuberculous women into five groups: *1: The Pretuberculous:* These patients are predisposed to the disease and show no pulmonary lesions. They may have some of the residual manifestations of a childhood tuberculosis. The general condition is only fair. They are thin but do not lose weight. At the beginning of pregnancy they are more fatigued than normal women, but it is not unusual to notice a general improvement as the pregnancy advances and they may even gain in weight. This group usually bears the pregnancy well, and the prognosis, in most cases, is good. Active pulmonary disease occurs as a result of the child bearing in about three per cent of the cases. *2: Long-Standing Healed Tuberculosis:* In this class the prognosis is a little more serious.

The patients are in good general condition. The pulmonary lesion is usually situated in the apices, and is fibrosed or sclerosed. They often give a history of having had serofibrinous pleurisy. More than half of these women bear the first pregnancy well; the second aggravates the tuberculosis and the third may terminate in death. *3: Active Tuberculosis:* These patients present signs of an active pulmonary lesion; tubercle bacilli are present in the sputum and the temperature is slightly elevated. Seventy-five per cent are made worse by their first pregnancy. *4: Advanced Tuberculosis:* In this group the disease is progressive, with signs of cavitation; tubercle bacilli are abundantly present in the sputum; the temperature is persistently elevated, and there is marked loss in weight. The prognosis is very poor. Ninety per cent succumb during the puerperium. *5: Acute Miliary Tuberculosis:* Patients suffering from this form of the disease usually die early, and, if they should be unfortunate enough to become pregnant, death is more rapid. It follows, therefore, that, the more advanced the tuberculosis at the onset of pregnancy, the greater the risks to the patient. The prognosis is always grave when active tuberculosis and pregnancy begin apparently at the same time. These patients are usually in good health before they become pregnant. Even before the first menstrual period is missed, they begin to lose weight. They cough and have a slightly elevated temperature. A sudden brisk haemoptysis may come as a great surprise both to the patient and physician. Very frequently patients are encountered who give a history of having had, at an earlier date, an active tuberculosis, and they consult the physician because of cough, loss of weight, fatigue and amenorrhoea. The absence of menstruation is usually attributed to the reactivated tuberculosis. They may have numerous haemoptyses which are often considered as vicarious menstruation. After a few months the unmistakable signs of pregnancy become evident. If a pregnant tuberculous woman shows improvement of her pulmonary lesion during the first few months of pregnancy, it is probable that she will endure the pregnancy without mishap. If the tuberculous process continues to become progressive after the sixth month, a fatal outcome may almost always be expected. A complicating tuberculous laryngitis adds to the gravity of the prognosis. *Treatment:* Medical treatment alone is, in the majority of cases, insufficient. Artificial pneumothorax may exert a favorable influence on the local lesion, but pregnancy so drains the reserve defensive powers, that the collapse becomes inefficient. Interruption of pregnancy in patients belonging to the first two groups is followed by favorable results, uncertain results in the third group, and unfavorable results in the other groups. If intervention is carried out before three and a half months, improvement occurs in 90 per cent of the cases. A late abortion or premature labor aggravates the disease in more than half of the cases even when conditions appear to be most favorable. Dilatation and curretage are usually sufficient in the early months. After three and a half months, subtotal hysterectomy, with bilateral castration under spinal anaesthesia, should be performed. The more radical procedures can easily be avoided if pregnancy is diagnosed early and proper treatment is instituted at once. Those who stand against the interruption of pregnancy, hope to save at least the infant. For a long time it was believed that the infant is not born tuberculous but may become so (*pas tuberculeux mais tuberculisable*). Since all the infectious diseases, acute or chronic, may be transmitted from the mother to the foetus, why should tuberculosis alone be the exception? The presence of tubercle bacilli in the placenta proves that transmission is perhaps rare but real. Recent studies, in recognizing the existence of a filterable virus of tuberculosis, confirm this view. Marriage should be counselled against in young women suspected of suffering from pulmonary tuberculosis. Those who are married should avoid pregnancy. If pregnancy occurs it should be interrupted before the third month in order that the woman may become cured of her tuberculosis and attempt another pregnancy at a later date.—*Tuberculose pulmonaire et état puerpéral, M. Metzger, Prog. Méd., January 14, 1928, no. 2, 45.*—(*U. E. Z.*)

Pregnancy and Pulmonary Tuberculosis.—The cause of the unfavorable influence of pregnancy upon pulmonary tuberculosis, which manifests itself during the first three months and is absent in the second half of pregnancy, is believed to be due to an anergy of gravidity, similar to that occurring in measles, whooping-cough and influenza, and is attributable to the changed cholesterol blood relations, as well as greater oxygen and calcium demands on the pregnant woman. During and after delivery the loss of fluids, such as milk, blood and lochia, and the depression of the diaphragm, act unfavorably. Tuberculous individuals are advised to become pregnant only after two years, at earliest, subsequent to clinical healing. If pregnancy occurs in spite of this advice, sanatorium treatment is believed

to be necessary, since thus the unfavorable influences of pregnancy may be balanced. Only in the rare cases in which sanatorium treatment reveals no benefit during the first three months is interruption of pregnancy considered advisable followed by further sanatorium treatment. Obstetrical divisions are believed essential for all sanatoria, and thus artificial abortion for tuberculosis would only be indicated in occasional cases. Only in severe cases combined with laryngeal tuberculosis is interruption believed always to be indicated, and this should be followed by sanatorium treatment.—*Lungentuberkulose und Schwangerschaft, E. Gross, Centralbl. f. Gyn., 1927, li, 744.*—(*H. J. C.*)

Relation between Upper Respiratory Tract and Pulmonary Tuberculosis.—This paper draws attention to the well-known but frequently overlooked facts that many symptoms related to the lungs have their origin higher up, in the region of the nose and throat, and likewise that many cases of *bona fide* disease of the lungs, such as bronchiectasis, tuberculosis, etc., are kept active and their symptoms aggravated by such infections of the upper respiratory tract. This study deals with 156 patients. All were examined independently by a competent rhinologist. X-ray examination of the lungs was made in every instance and of the accessory sinuses in the majority. The diagnosis of these patients is given in tabulated form. In the group of 26 cases of pulmonary tuberculosis, in which there was no laryngeal involvement, chronic tonsillitis was the commonest complication. Diseased sinuses played a comparatively small part. It is not claimed that the removal of diseased tonsils or the straightening out of a deviated septum will cure pulmonary tuberculosis. But there is evidence to show that in many cases of pulmonary tuberculosis unsatisfactory progress was attributable chiefly to infections of the upper respiratory tract rather than to the tuberculous disease in the lung, and that in such cases improvement was made only after suitable measures had been taken to remove or counteract the infection or the mechanical faults in the nose and throat. *Results:* Of the entire group of patients concerning whose present condition there is fairly accurate knowledge, 43, or nearly 30 per cent, were distinctly improved as to their local symptoms, such as cough, expectoration, and nose and throat troubles, and 17 were unimproved. Of the same group 54, or approximately 35 per cent, showed a decided gain in general condition, strength, energy, weight, etc., while only 6 were unimproved. These figures tend to show that the clearing up of nose and throat infections and the remedying of local defects in that region has a decidedly beneficial effect on certain pulmonary disorders. *Conclusions:* A certain number of symptoms related to the lungs such as coughing, expectoration, etc., and another group of symptoms strongly suggesting pulmonary tuberculosis, such as loss of weight and strength, rapid pulse and fever, may be due to infections of the upper respiratory tract, and this possibility should always be borne in mind. For this work coöperation between the internist and rhinologist is important.—*The Relation of Infections of the Upper Respiratory Tract to Chronic and Subacute Infections of the Lungs, J. B. Hawes, 2nd, Boston M. & S. J., November 24, 1927, cxcvii, 961.*—(*B. T. McM.*)

Measles and Tuberculosis.—The relation between measles and tuberculosis was studied in a series of children of beginning school age, during an epidemic in the summer of 1925. The initial examinations were made 13 to 20 days after the outbreak of the eruption, and when a widespread catarrh of the lungs was still determinable. Of 98 boys there were 11 reacted positively to the Moro tuberculin test, and of 94 girls 16 gave positive skin reactions. Five months after the termination of the measles there occurred a marked increase in the tuberculin reaction. The increase among boys was 21.8 per cent and among girls was 22.6 per cent, while the usual increase for this age period was 5.3 per cent in boys and 6.2 per cent in girls. This was attributed to a return of a former positive reaction, which had been negative following the measles because of a measles anergy as well as subsequent new infections. Roentgenological examination of 46 children, that were negative in the first examination and reacted positively after 5 months, verified the latter contention. Among 47.8 per cent children (22) there were found fresh tuberculous processes, predominantly inactive in 26.1 per cent and with no other disease findings in 26.1 per cent. Among the 22 with tuberculous findings there were 6 with fresh primary *Affekts* in the lungs, 2 with a definite parafocal inflammation of the hilum, and in the remaining 14 there was a predominantly fresh bronchial lymph-node tuberculosis. The roentgen findings also indicated the flaring up of healed or latent foci following measles. In no case was a severe tuberculous disease of the lungs determinable. There was no miliary tuberculosis, no caseous pneumonia, and no meningitis following the measles. It is concluded that an activating influence of the measles upon an existing tuberculous infection was exer-

cised only during the first three or four years of life.—*Die Bedeutung der Masern für die Entstehung und die Aktivierung einer Tuberkulose und ihre Bekämpfung durch die Tuberkulosfürsorgestellen, F. Klein, Beitr. z. Klin. d. Tuberk., 1927, lxvi, 497.—(H. J. C.)*

Surgical Operations and Pulmonary Tuberculosis.—Surgical treatment, instituted in 10 patients suffering from chronic pulmonary tuberculosis, was not followed by any exacerbations of the disease. In the majority of cases the operations were performed for intercurrent complications requiring surgical therapy. The temperature curve remained unchanged in all cases. There were no changes in physical signs. Some of the patients showed marked constitutional improvement and gain in weight. Even in individuals suffering from organic disease of the gastroenteric tract, which required extensive operative treatment, there was a distinct gain in weight and improvement of the pulmonary lesion. All of the patients with the exception of one are now living. They have been under observation for periods ranging from three months to three years. The only death was due to metastatic carcinomatosis following cancer of the breast. Some authors believe that major surgical operations aggravate or reactivate preëxisting or latent tuberculosis foci, and this they believe is due to a hepatic insufficiency. Liver-function tests were done in all of the patients studied before and after operation, and in spite of the fact that in some cases chloroform and ether anesthaesia was used no determinable liver damage was done. Surgical intervention is advised in tuberculous subjects, only when the pulmonary lesion is of the chronic type and when the patients are in good general condition.—*Sull'ulteriore decorso della tubercolosi polmonare dopo interventi chirurgici, A. Taronna, Tubercolosi, November, 1927, xix, 431.—(U. E. Z.)*

Amputation of Arm and Pulmonary Tuberculosis.—Two cases are reported in which unilateral pulmonary tuberculosis followed amputation of an arm. The lack of pulmonary expansion on the side of the amputation; resulting in diminished aeration and circulation, is believed to have set up a condition favoring tuberculosis.—*Armverlust und Lungentuberkulose, S. Spitz, Beitr. z. Klin. d. Tuberk., 1927, lxvi, 258.—(H. J. C.)*

Cachexia as Activator of Pulmonary Tuberculosis.—A large autopsy material was studied to determine whether chronic wasting disease can reactivate a latent tuberculosis. Especially interesting were the cases in which were found small fresh active tuberculous foci. The origin of these were believed to be chalky or calcified tuberculous lesions, which in 50 per cent of the cases contain a very few bacilli. There was nothing found to substantiate the view that these were fresh exogenous reinfections. Various circumstances, such as carcinoma, arteriosclerosis, heart disease, osteomalacia, etc., could lead to a new flaring up of latent tuberculous foci. It is believed that latent tuberculous foci can be caused to flare up especially by conditions associated with cachexia.—*Reaktivierung latenter Tuberkulose und ihre Ursachen, A. Arnstein, Beitr. z. Klin. d. Tuberk., 1927, lxv, 713.—(H. J. C.)*

Origin of Reinfection in Pulmonary Tuberculosis.—This is an elaboration of an earlier work by Ghon and his coworkers on exogenous and endogenous reinfection. In the previous study of 100 cases the striking findings were that 84 per cent of the cases revealed, in the lymph nodules of the venous angle, histological tuberculous changes in various stages of development, and in 4 per cent of the cases changes which in all likelihood were remnants of tuberculosis. Since the venous-angle lymph nodes empty directly into the blood-stream, the possibility of an extension from this source opens the chance for a new infection of the lung. The present report is concerned with seven additional cases in young individuals dying of pulmonary tuberculosis or purulent meningitis. In all the cases there was a primary pulmonary infection, and in five of the cases the primary *Affekt* was determined with certainty. In six of the cases there were remnants of the primary infection in the venous-angle lymph-nodes and early tuberculous changes in the lung, which led to the discussion of whether the fresh pulmonary foci developed from exogenous or endogenous sources. In one of the cases the absence of fresh anatomical tuberculous changes in the venous-angle lymph-nodes excluded endogenous reinfection definitely. In another case the changes in the lymph-nodes might serve as a source of the fresh pulmonary infection, and in the third case this is negatived as a possibility. In the remaining four cases the requirements for an endogenous reinfection are fulfiled by the presence of numerous fresh epithelioid tubercles in the angle lymph-nodes, but even here it must be admitted that the possibility exists for an exogenous reinfection. It is possible that both forms of reinfection or superinfection exist side by side.—*Zur Entstehung der Reinfektion der menschlichen*

Lungenphthise, A. Ghon, P. Kreider and H. Kudlich, Virchow's Arch. f. path. Anat., 1927, cclxiv, 563.—(H. J. C.)

Case of Alleged Congenital Tuberculosis.—A child, about six weeks old, was admitted to the hospital on account of convulsions. Signs and symptoms justified the diagnosis tuberculous meningitis. The infant died a few days after admission. The autopsy substantiated the clinical diagnosis. In addition, there existed miliary tuberculosis of the liver, lungs, and kidneys. Larger nodules were found in the spleen. There was an ulcerative tuberculosis of the intestines, and tuberculous processes in the mesenteric lymph nodes and in the lymph nodes of the hepatic hilum. The primary complex was assumed to have been in the placenta which was apparently not examined. No evidence is presented to exclude the likelihood of a postnatal, exogenous infection. The infant had been fed by its mother who had been under treatment repeatedly on account of an apical tuberculosis.—*Ein Fall von kongenitaler Tuberkulose, Rasor, Klin. Wchnschr., May 27, 1928, vii, 1041.—(M. P.)*

Tuberculosis in Infants.—The object of this study was to obtain a more accurate idea of the incidence of tuberculous infection among the general infant population. The results obtained from a series of intracutaneous tuberculin tests, conducted at baby health stations and clinics, upon 1,656 babies, were compared with the information obtained from hospital records of 4,003 infants under treatment. The majority of the babies at the health stations were in good health. There were no diagnosed cases of tuberculosis among them. The incidence of infection was 1.3 per cent. The infants at the clinics were under treatment for illness of various sorts but none showed physical signs or symptoms of tuberculosis; 4.5 per cent of them gave positive tuberculin reactions. In 4,003 hospital patients the incidence of infection was 11.4 per cent, but only 144 infants in this group of 460 who reacted positively had manifest tuberculous disease and 112 were in the advanced stages of pulmonary, miliary or meningeal tuberculosis. The incidence of tuberculous infection was appreciably higher among infants who lived in the more crowded and congested sections of the city than among those from less congested areas. The figures in this study indicate that the infant's resistance to tuberculous infection is higher than it was formerly believed to be; but his resistance to tuberculous disease is relatively low. —*A Study of Tuberculosis in Infants, M. A. Asserson, Tubercle, April, 1928, ix, 323.—(W. I. W.)*

Tuberculosis of Infants and Children in Warsaw.—This is based on the Warsaw vital statistics from 1913 to 1923 inclusively. Prior to the war there was a natural increase in population which ceased about 1915. Then the number of births fell rapidly each year, until in 1918 it was only half that before the war. During the same period the general mortality increased frightfully, reaching in 1917 the figure of 41.44 per 1000. In this same year there were 34,693 deaths, of which 8,158 were due to tuberculosis, and 2,550 to exhaustion or starvation. In 1919 normal conditions returned, and the mortality was a little lower than before the war. Before the war there died of tuberculosis 320 per 100,000 persons and in 1917, 975 per 100,000; that is, during the German occupation the rate was tripled; during 1918–1919 it accounted for one-fourth of the deaths, and in 1920–1922 for one-sixth. Tables arranged according to age-groups show that during the war the disease made especially great ravages among older children and adolescents. The effects of cold, famine, poverty and pillage affected tragically their physical development, extending into puberty. It would seem from the tables that the rate among infants and younger children decreased. The following are the most plausible explanations: *1*: The number of children of this very young age was much less. *2:* Babies suffered less from hunger because nourished by the breast. The state of children generally was deplorable, those of two or three years weighing scarcely two-thirds of normal weight. This progressive deprivation and poor nutrition undoubtedly weakened their resistance to tuberculosis. The postwar diminution of tuberculosis mortality may be ascribed to: *1:* Death of a considerable number of tuberculous during the war. *2:* Death of a considerable number of constitutionally feeble persons during the war. The later increase in the last few years, according to Ciaglinsky, is due to the replenishment of the tuberculous group with new material, causing the mortality to reapproach the normal fixed by the sanitary condition of the people. *Comparison of Childhood Mortality from Tuberculosis, Specific Infections, etc.:* A graphic table accompanying the article shows clearly the relation of (1) curve of tuberculosis morbidity, (2) that of acute infections, (3) that of respiratory diseases and (4) that of digestive diseases: The last is high at the beginning of infancy and falls abruptly. Diseases of the respiratory tract show a fairly high early mortality,

preponderating during the third year, then falling gradually. Infectious diseases increase rapidly, and preponderate from three to six years; after this they gradually diminish, and yield precedence to tuberculosis and even to diseases of the respiratory tract. Tuberculosis begins at a low level and rises abruptly. In the school years, from 5 to 15, it causes as many deaths among boys, and more among girls, than all the infectious diseases. During puberty it causes half the deaths among girls and one-third among boys. During the entire period of childhood up to 15 years it accounts for 13 per cent of all illness. The lymphatic forms make up 50 per cent, osteoarticular tuberculosis 22 per cent, pulmonary 15 per cent. The importance of the lymphatic system in the child, especially in tuberculous infection, has been repeatedly emphasized. Exudative pleurisy and meningitis are the only forms more common among boys (100 to 59 and 100 to 69). For pulmonary tuberculosis there are 100 boys to 151 girls, and for acute miliary tuberculosis 100:220. The incidence of tuberculosis in children increased from 6 per cent in 1915 to 15.5 per cent in 1917 (two and a half times), falling to 7 per cent in 1921. The increase was chiefly in pulmonary tuberculosis, which in children is rare under normal conditions. Still another graph shows the tuberculosis incidence to increase in winter (December, January and February) and to fall in spring, being lowest of all in the autumn. The winter, lack of light and air, close confinement, all have an appreciable effect. The child, weakened during the winter, falls a victim in the spring. Then comes summer, with increased freedom, light and air, and the curve falls. However, tuberculosis of the serous membranes shows its highest incidence in April and July, and meningitis in the spring. Exudative pleurisy shows peaks in March, May and July (170 hospital cases). A graph for age incidence of tuberculous meningitis is shown. Its peak is about the seventh year. Of 3,200 cases of infantile tuberculosis 15 per cent died at the hospital, the rest returning home, and 24 per cent improved. Even 12 per cent of osseous tuberculosis cases were fatal. The importance of contamination in the home is shown by Pollack's figures,—98 per cent positive Pirquet reactions among 285 children of tuberculous parents. Those exposed under four years of age showed fewer positive reactions, probably because more often overwhelmed by the infection. Infants must be removed from tuberculous surroundings and their immunity increased.—*La tuberculose infantile d'Après le chiffres, T. Kopec, Rev. d. l. Tuberc., June, 1927, viii, 351.—(A. P.)*

X-ray Diagnosis of Tuberculous Cervical Adenitis in Infancy.—X-ray photographs of the cervical lymph nodes are of value in determining whether inflammation of these structures is tuberculous or not. The anteroposterior view, with the head thrown back and turned slightly to avoid the shadow of the mandible, is best. The cases of two infants are reported, one of whom had calcification of the cervical lymph nodes with positive tuberculin test, at the age of five months. The other patient, one year old, had calcified nodes in the abdomen on the left side at the level of the third lumbar vertebra. The cervical nodes on the right side were calcified, though these had given no symptoms and were not large enough to attract attention.—*Tuberculosis of the Cervical Lymph Nodes in Infancy, E. C. Dunham and A. M. Smythe, Am. J. Dis. Child., xxxiv, 962.—(P. J. W.)*

Tuberculin Skin Test in Early Infancy.—This is a study of 6,259 tuberculin skin tests performed on children under two years of age in the *Casa del Niño* at Rosario de Santa Fé, Argentine Republic. The most accurate results were obtained by the use of the intracutaneous test, the tuberculin being diluted 1:5,000, and 0.2 cc. being injected. The Pirquet test was much less reliable. Among known tuberculous children, the Mantoux was positive in 77 per cent, the Pirquet in 25 per cent. A number of infants received up to eight inoculations at varying intervals, in order to rule out the possibility of tuberculous infection. The author is convinced that fever is *not* a common sign of tuberculous infection in an infant. With regard to prognosis, though tuberculous infection appearing during the first year of life may be of great gravity, its danger has been over-estimated. Frequently, in infants, caseous hilum lymph nodes have been found which have never given any symptoms. The great majority of the author's cases recovered. Death occurred as a result of such complications as meningitis, bronchopneumonia, miliary dissemination, etc., just as in adult patients. —*Dermo-réaction à la tuberculine dans la première enfance, P. Rueda, Arch. de Méd. d. Enf., March, 1928, xxxi, 159.—(P. J. W.)*

Human and Bovine Tuberculin Tests in Children.—Heated bovine and human tuberculins were used, in dilution of 1:1,000. Of a total of 208 children tested with both types, 75 gave positive reactions, and of these, 71 were positive-and-both-equal. (Many of the children were from the tuberculosis clinic and baby wards (New York) so that this is naturally a high figure.) The authors were unable to differentiate the

type of infection with heated concentrated tuberculin. The more active toxic substances of tuberculin are thermolabile and are the true differential toxins which are attached to albuminous substances (Detre). The possibility of double infection in every one of the positive cases is extremely remote. Many of the cases gave a definite history of human contact, and three cases had never had cows' milk. It was thus impossible to differentiate the type of infection with old tuberculin. In the unheated preparation there is a filterable virus capable of producing an infection, which would make a test with such a preparation dangerous.—*Tuberculin Tests in Children: A Comparative Study of Human and Bovine Tuberculin, A. G. DeSanctis and H. A. Reisman, Am. J. Dis. Child., December, 1927, xxxiv, 1042.—(P. J. W.)*

Pirquet Testing.—Scarification and puncture tests were performed on 281 children at the Lymanhurst School for Tuberculous Children. In applying the puncture test, a single puncture was made with an ordinary sewing needle, the epithelium being penetrated through the drop of tuberculin. The tests were positive in 223 instances and negative in 58. Those positive by the scarification method were without exception the same patients who were positive to the puncture test. Positive reactions obtained by single puncture through a drop of tuberculin were in general as definite as those obtained by scarification. When the same needle is used in making the puncture through two separate drops of tuberculin on the forearm, the site punctured second frequently produces the more pronounced reaction. The test did not fail to react in any of the 223 cases in which the drop of tuberculin was wiped off immediately after the puncture was made. The puncture method is obviously less objectionable to the child, and obviates the inconvenience of supervising the child until the tuberculin dried on the skin.—*The Pirquet Test: Comparison of the Scarification and the Puncture Method of Application, C. A. Stewart, Am. J. Dis. Child., March. 1928, xxxv, 388.—(P. J. W.)*

Tuberculin Tests in Schools.—Concentrated old tuberculin was used for skin tests on almost 3200 school children. In two cases, however, severe reactions occurred, which made it seem advisable to discontinue the use of the concentrated tuberculin. In one of the children, free from all symptoms of the disease and the other free from symptoms for many years, there occurred severe phlyctenular corneal inflammations. In addition to this there resulted also inflammatory conditions of the middle ear.—*Die Tuberkulinprobe in der Schule, Vonessen, Beitr. z. Klin. d. Tuberk., 1927, lxvii, 464.—(H. J. C.)*

Tuberculosis in Young School Children.—A systematic study of 7 primary schools for the determination of tuberculosis, using clinical and roentgenological methods, was undertaken. The tuberculin-positive, ill, or otherwise suspicious children were kept under continual observation, and examined at intervals of 2, 3 and 6 months. Thus were examined a large series of girls and boys in the first and third years of school, and there was found a preponderance of new infections in girls during the first school year which was previously noted by other authors. The number of Moro-positive children varied in the individual school, being larger in the densely populated neighborhoods with poor home surroundings. Exudative findings of mild or severe grade, according to Redeker, were rare. Of the apparently "scrofulous" children, 33.5 per cent reacted positively. Bone, skin and lymph-node tuberculosis was found only 19 times. Pulmonary changes clinically diagnositic of tuberculosis was rare, there being 2 cases of secondary tuberculosis of the upper lobe, a severe infiltration, and a tumorous bronchial lymph-node tuberculosis. The most important value of the systematic examination was in the roentgen examination. An early primary focus was found in 8 of the 6-year-old children and in one 8-year-old. Calcified or dense isolated pulmonary foci and related hilum calcified foci were found 61 times in the first school year, that is, in 12.1 per cent of all tuberculin-positive children, and 23 times, or in 13.9 per cent of the third-school-year children. The primary foci, fresh and calcified, were on the right side in 71.9 per cent of the cases in the mid-region in 55 per cent, in the lower lobes in 25 per cent, in the upper lobes in 20 per cent, and in 2 cases in the apices. The transition into the secondary stage mostly concerns the bronchial lymph-nodes, and is difficult of determination. Enlarged bronchial nodes were found four times in the first year of school and three times in the third. All kinds of transition forms were observed. Acute infiltrations were found 16 times in 1,677 children six years old, and remnants of these 18 times. Among the 8-year old children, among 374 only one active infiltration was found, with residue 10 times. The severe forms of secondary tuberculosis, caseous pneumonia, intrapulmonary hilum tuberculosis, and "adult phthisis" were not observed.—*Die Tuber-*

kulose im frühen Schulalter. Ergebnisse systematischer klinischer und röntgenologischer Reihenuntersuchungen, O. Koeffer, Beitr. z. Klin. d. Tuberk., 1927, lxvii, 417.—(H. J. C.)

Evolution of Tuberculous Infection in Childhood.—A group of children was studied in order to gain knowledge of the permanence and of evolution of early tuberculous infection, of the frequency of exogenous reinfection during youth, and of the relation it may have to the subsequent development of disease. The children were observed at intervals through a period of eight to twelve years. *Conclusions:* Though the maximum opportunity for tuberculous infection of the child is present in the homes of the actively tuberculous, extradomiciliary and extramural foci are also important sources of early contamination. The variations of the response to the Pirquet test indicate that tuberculous infection may vary in degree from time to time, even when it has been acquired in earliest childhood. Roentgenographic evidences of moderate enlargement of the mediastinum, of slight fibrosis of the lungs, or of old localized infiltration of the base of the lungs, may remain unaltered through a period of years, even when they are present in young children who have a positive Pirquet reaction. The number of young individuals exposed to the risk of tuberculous infection that will develop clinical tuberculosis is relatively small if contact with the source of infection is removed, and good conditions of hygiene and of diet are established.—*The Evolution of Tuberculous Infection in Childhood, C. R. Austrian, Tubercle, February, 1928, ix, 229.*—(*W. I. W.*)

Nontuberculous Child.—In investigation of the child who is suspected of having tuberculosis, an examination of the sputum is of positive value only if it is positive, and is of little or no value in excluding tuberculosis, while the Pirquet test is of very definite value if it is negative, since a positive test does not indicate whether the infection has any clinical significance. A negative reaction must be repeated to be accepted. Underweight and a run-down condition are clear indications for investigation, but underweight of itself in an active child is of no significance unless accompanied by definite clinical symptoms. On the other hand, a normal weight and an apparently normal state of nutrition do not exclude tuberculosis. A persistent cough requires careful study, but a history of frequent attacks of cough over a period of years would lead one away from a diagnosis of tuberculosis toward the possibility of repeated attacks of chronic bronchitis or bronchial asthma. A cough due to tuberculosis is very likely to be continuous, and to be accompanied by fever, fatigue, and other clinical evidence. A negative Pirquet test in these cases is often of great value. Bronchiectasis should be thought of when there are infrequent prolonged spells of coughing brought on by change to a certain position, with large amounts of thick, foetid sputum. The presence of a foreign body sometimes offers greater difficulties, often the only symptoms being a wheeze and a cough. A wheeze not evidently asthmatic should be regarded as suggestive. A plugged bronchus results in an area of dulness with absent breath-sounds, while if there is alternate complete and partial plugging, the absent breath-sounds will alternate with bronchial breathing and bronchophony. Complete plugging of a main bronchus results in solidification, and contraction in volume of the affected portion, with drawing of the heart into the dull area, and an emphysema of the opposite lung. Obstruction due to a valve-like foreign body results in hyperresonance of that side, and pushing of the heart to the opposite side. When only one lobe is obstructed the diagnosis is more difficult, but is easily confirmed by a bronchoscopist. A persistent low-grade temperature of 99 to 99.5° is more frequently due to some other condition than tuberculosis. But if the temperature occasionally goes higher or if the Pirquet test is positive the child should be treated with the possibility of a tuberculous infection in mind. Persistent fever and pathological changes in the lungs after frank pneumonia are in favor of an unresolved pneumonia, but if the beginning was insidious, the temperature never over 101° or 102°, or if there was distinct pleuritic pain, tuberculosis should be suspected strongly. A diagnosis of an early miliary tuberculous bronchopneumonia is more readily made from the X-ray film than from the physical findings. Strict measures should be taken to prevent exposure of infants to infection in the home. Ordinary precautions that will protect the adult or the older child from the open case of tuberculosis are wholly inadequate for the very young. The baby that has been exposed even for a short time should be considered tuberculous and treated as such. —*The Nontuberculous Child, J. Brennemann, J. Am. M. Ass., February 25, 1928, xc, 586.*—(*G. L. L.*)

Tuberculous and Nontuberculous Pulmonary Disease in Childhood.—In the differential diagnosis of tuberculous and nontuberculous pulmonary affections

in childhood, the tuberculin test and X-ray studies play an important rôle, but neither one of the two procedures permits of a definite diagnosis. Certain larger groups of clinical pictures are discussed separately. The first group comprises the specific bronchitides and infiltrations in early childhood associated with the primary focus and nonspecific pulmonary processes. The tuberculous infection during this period results usually in localized bronchitis and infiltration. Perifocal inflammations around the mediastinal lymph nodes or the parenchymatous focus are prominent. Coalescence may produce extensive infiltrations, whose physical signs are identical with those produced by nonspecific bronchopneumonias. In the differentiation from the latter, a history of contact and insidious onset, the gray pallor of the patient, and, in some cases, skin tuberculids are significant. The existence of tuberculin allergy does not necessarily prove the tuberculous nature of the active disease. Unless excavation is demonstrable, the X-ray picture is not characteristic. The second group comprises nonspecific, particularly centrally located pneumonias and extensive hilum tuberculosis in the secondary stage. These latter processes are perifocal inflammations, caused by endotoxic products, probably identical with the lesions which were described as epituberculosis or paratuberculosis. The tissues are oedematous, sometimes affecting more than one lobe. These lesions are characterized by frequent and complete resorption. If they persist for a longer time they may be followed by induration, shrinkage, and the formation of bronchiectases, or they may end in caseation and cavitation. The scarcity of auscultatory signs over such infiltrations is frequently in marked contrast with the X-ray findings. Their most characteristic sign is apyrexia and good general condition. They may recur without apparent impairment of general health, while recurrences of nonspecific bronchopneumonias produce marked symptoms. In contrast to the nonspecific pneumonias, these tuberculotoxic infiltrations hardly ever localize in the basal parts. The third group comprises the specific and nonspecific bronchiectases. A negative tuberculin test is conclusive proof against tuberculosis as an etiological factor; a positive test is inconclusive. Tubercle bacilli can be demonstrated only in rare instances. Strictly basal bronchiectases are rarely tuberculous. The differential diagnosis is important from a prognostic viewpoint, since the tuberculous variety frequently gives rise to progressive, caseating lesions during or shortly after puberty.—*Differentialdiagnose tuberkulöser und nichttuberkulöser Lungenerkrankungen im Kindesalter, H. Wimberger, Wien. klin. Wchnschr., March 1, 1928, xli, 303.*—*(M. P.)*

Pathology of Tuberculosis.—Latent tuberculous lesions of the lungs and tracheobronchial lymph nodes are revealed by radiological examination, and when they are accompanied by an active tuberculin reaction it may be assumed that they are not dormant or healed. These lesions, well known to pathologists, may have grave clinical significance. They are not infrequently the source of tuberculosis of meninges, bone, genitourinary system, adrenals, and other organs; they may produce clinically recognizable pulmonary tuberculosis of the type of childhood, or they may be followed by the adult type of pulmonary disease. Latent tuberculosis of the tracheobronchial lymph nodes of young children and latent apical tuberculosis of children during the second decade of life indicate the presence of grave infection, and may forewarn against clinically manifest disease. These latent lesions appear with great frequency in families exposed to open tuberculosis. All members of families in contact with tuberculosis should be given repeated tuberculin tests and radiological examinations even though they appear to be in good health. When these examinations reveal latent disease, the well-known measures directed to retard the progress of tuberculosis will prevent the development of manifest disease. Tuberculous infection in childhood increases resistance to the disease, but it is at the same time a source of danger. Recognition and control of latent infection are effective means of preventing tuberculosis.—*Pathology of the Tuberculosis of Childhood and its Bearing on Clinical Work, E. L. Opie, Brit. Med. J., December 17, 1927, no., 3493, 1135.*—*(W. 1. W.)*

Course of Severe Childhood Tuberculosis.—Attendance at school has a detrimental influence upon the tuberculous child, and, therefore, schools should be incorporated with children's sanatoria. Infectious diseases can have an unfavorable effect on childhood tuberculosis. The favorable cirrhotic forms occur more frequently in children and infants from tuberculous families. Thus, those with inherited hazards are more favorably situated than those coming from tuberculosis-free surroundings. In the majority of children there results a favorable termination, with the development of pulmonary and lymphatic foci (primary and reinfection). Primary pulmonary foci

and reinfection foci are difficult to differentiate. While the primary *Affekt* is usually poorly vascularized, and frequently lies calcified in unchanged pulmonary tissues, the reinfection focus has a rich vascularization, is less often calcified, and lies in atelectatic unchanged tissue. Childhood tuberculosis occurs predominantly as an infiltration, and its initial spread in the lung is mainly along the blood and lymph-channels. Cirrhotic cavernous tuberculosis is not so rare in school children. In respect to course and quality there is no great difference between the tuberculosis of the school child and that of the adult. During puberty there is often a progression of the childhood tuberculosis, in which case the cirrhotic is transformed to the exudative tuberculosis.—*Über schwere Kindertuberkulose und die Beziehungen zwischen der Tuberkulose der Kinder und der späteren chronischen Lungentuberkulose, R. Zimmermann, Ztschr. f. Tuberk., 1927, xlvii, 353.—(H. J. C.)*

Blood Monocytes in Tuberculous Children.—The work done by Sabin and co-workers on the primary rôle of the monocyte in tuberculosis in rabbits has stimulated much investigation in human beings, but mostly in adults, and but few results have as yet been published. It was thought that in children the findings should be more clear-cut because of the greater likelihood of tuberculous lesions being active and uncomplicated by old healed lesions. For this purpose a group of children having positive tuberculin tests was studied and controlled by a group showing negative tests. The cases were from the wards and out-patient department of the New Haven Hospital. The main features of Sabin's work and that of others are reviewed and the monocytes classified and described. Sabin has shown that the monocytes comprise the "large mononuclear and transitional cells" of Ehrlich and Mallory's "endotheliocytes," that all these are one and the same, and derived, not from endothelium, but from the reticular cell, the common stem-cell of all white blood cells. It is primarily the cells of the monocytic, not the lymphocytic, series which she finds affected in tuberculosis. Mature monocytes possess mitochondria and phagocytic activity. The distinguishing feature is the so called rosette-formation about the centrosphere just opposite the nuclear indentation, consisting of fine granules taking a salmon tint in vital neutral red. There are also vacuoles, which stain with the red, and mitochondria, staining deep blue with Janus-green. The monocyte can ingest tubercle bacilli in tissues or blood, but probably cannot digest them, and is itself injured, becoming non-motile. Eventually an epithelioid cell develops which possesses a large rosette. Further stimulation either results in fatty degeneration or formation of a giant cell of the Langhan's type. Sabin and co-workers found monocytosis especially marked in animals of low resistance with extensive tuberculosis. They found the normal ratio of monocytes to lymphocytes about 1:3 and a reversal of this ratio to be of unfavorable import. *Methods:* Sabin's supravital technique was used. Absolutely clean glassware is highly important, as is absolutely pure alcohol, the commercial absolute alcohol containing traces of acid which spoil the dye. The stains used were neutral-red, Janus-green, and Wright's blood stain. Stock solutions were prepared with absolute alcohol and diluted, in the case of neutral-red by adding 5 drops of stain to 5 cc. of absolute alcohol. To study mitochondria add 1 or 2 drops of saturated Janus-green. The slides, previously stored in 80 per cent alcohol, were removed, dried, flamed, flooded with stain, drained and dried in upright position, and then stored in a dust-proof box. Supravital counts and fixed smears were found to check within 10 per cent, there usually being a lower polymorphonuclear count in the fixed preparation. The supravital preparations were all counted about fifteen or twenty minutes after drawing the blood, which was dropped on a clean cover-slip and inverted on the stained slide, rimmed with vaseline of a high melting point and examined on a warm stage, which is essential for accurate counts. *Summary of Results: 1:* Nineteen counts were made on children with negative tuberculin tests, grouped in age-periods as follows: (a) under 24 hours old, (b) under 1 year, and (c) between 1 and 11 years. For these the average monocyte-lymphocyte ratios were respectively 1:3.7, 1:11.6, and 1:5.7. No modified monocytes or epithelioid cells were found. *2:* Three counts were made on children with negative tuberculin tests in whom there was reason to suspect the existence of tuberculosis. In all three cases modified monocytes or epithelioid cells were found. *3:* Counts were made on 19 children with positive tuberculin tests. Four had very high monocyte-lymphocyte ratios, above 1:1.1, and in three extensive active tuberculosis was found to exist. The others showed fair degrees of clinical resistance to tuberculosis. Epithelioid cells or modified monocytes were practically always present in the blood stream. Peaks in the monocyte curves were usually accompanied by depressions in the lymphocyte curves and

followed by slight eosinophilia. *Conclusions: 1:* Modified monocytes or epithelioid cells are almost constantly present in the blood stream of patients with active tuberculosis. They are not believed to occur in the blood of healthy persons or those with other common diseases, but are present in Malta fever (Sabin). *2:* Monocytes, including modified types, become more numerous in the blood when extensive tuberculosis exists. *3:* A rise in the monocytic level of the blood is usually accompanied by a fall in the lymphocytic level and at such times extension of tuberculous lesions has been shown. *4:* Moderate eosinophilia follows periods in which the monocyte-lymphocyte ratio has been raised. *5:* When the monocytes of the blood are more numerous than the lymphocytes there exists widespread tuberculous lesions with low resistance. *6:* When the monocytes of the blood are much less numerous than the lymphocytes the patient usually shows high resistance to tuberculosis with presumably healed or healing lesions. *7:* Modified monocytes or epithelioid cells may appear in the blood-stream in incipient tuberculosis before the intradermal test is positive. *8:* The work of Sabin and coworkers has a clinical application in the diagnosis and prognosis of tuberculosis in infants and children. This present piece of work should be repeated and checked up on a larger series.—*A Study of the Blood Monocytes in Children with Tuberculosis, P. M. Rogers, New England J. M., May 24, 1928, cxcviii, 740.—(A. P.)*

Massive Atelectasis of Lung Complicating Fresh Primary Complex.—Acute massive atelectasis of the lungs is considered as being caused by some disorder centering, primarily, about the bronchus. It may be an intrabronchial obstruction, an extrabronchial obstruction, or an idiopathic obstruction. A case is presented of a girl, aged 2 years, who suffered acute massive atelectasis of the lung resulting from extrabronchial as well as intrabronchial causes. The basic cause of the atelectasis was the enlargement of the regional lymph nodes caused by a fresh primary tuberculous complex, this enlargement being marked enough to include the already inflamed bronchus, with subsequent atelectasis of the lung. Plugs of exudate or mucus may also have been present. Considering the results of clinical examination, there is no doubt that the most important adjunct in the diagnosis of acute massive atelectasis or of the primary tuberculous complex is X-ray examination, including fluoroscopy.—*Acute Massive Atelectasis of the Lung Complicating a Fresh Tuberculous Primary Complex, E. G. Stoloff, Am. J. Dis. Child., February, 1928, xxxv, 239.—(P. J. W.)*

Nontuberculous Pulmonary Fibrosis in Children.—In contrast with the family history of tuberculous children, that of children with fibrosis is practically always free from tuberculous taint. Previous history shows a high incidence of measles, whooping-cough, or pneumonia. The incidence of the latter disease is greater than that in normal children. Sixty per cent of 37 cases studied had had pneumonia. Expectoration is conspicuous by its absence. Slight exertion, in cases of pulmonary fibrosis, produces dyspnoea out of all proportion to the amount of exertion. Cyanosis is one of the most constant signs of the disease. If tuberculosis develops in such cases, the cyanosis diminishes in degree as the tuberculosis develops. Clubbing of the finger-tips was found in two-thirds of the cases of fibrosis, being more marked than that found in children having tuberculosis. At one examination of the chest, many loud consonating râles may be heard, and at another a few days later there may be complete absence of adventitious sounds. The temperature is usually normal, but pyrexial attacks of varying severity occur, and because of the increase in râles are often mistaken for pneumonia. X-ray photographs taken during such attacks show evidence of inflammation around the bronchi, or patchy consolidation at the base or near the root of one lung. Only 25 per cent of the 37 cases studied were up to or above the average weight for their age; and one third were 14 pounds or more under weight. Eighty-seven per cent gave negative Pirquet reactions, which lends support to the view that these cases are not tuberculous in origin. The possibility of fibrosis being due to syphilis was considered. Eight per cent of the cases gave a positive Wassermann reaction. Antisyphilitic treatment had no effect on the disease. The authors quote the observation of Lundsgaard and van Slyke, that, when oxygen unsaturation rises above 6.7 volumes per cent in the capillary blood, cyanosis develops. Because of the frequency of cyanosis in patients with fibrosis, the blood-oxygen content of venous blood was tested in the cases under observation. In every case this was found to be diminished, the diminution apparently depending on the extent of the fibrosis rather than on the duration of the disease. The blood of children suffering from slight but active pulmonary tuberculosis (with sputum positive for bacilli) was also examined. In all these cases the blood-oxygen content was

normal. In cases of pulmonary tuberculosis of long standing (believed to supervene on a pre-existing fibrosis) the blood-oxygen content was diminished. In fibrosis of the lungs the fibrosis occurs around the bronchi, in the interlobular septa, and in the alveolar wall. Absorption of oxygen through the alveoli is interfered with, though the circulation of blood through the capillaries surrounding them is maintained. The result is an "unaerated shunt." In tuberculosis, on the other hand, though the tubercle may form in the alveolar wall, the blood-vessels in the tuberculous deposit become thrombosed, and the blood supply is thus cut off from this area and diverted through other parts of the lung.—*Non-Tuberculous Fibrosis of the Lung in Children, C. D. S. Agassiz and W. J. Gill, Arch. Dis. Child., February, 1928, iii, 1.*—*(P. J. W.)*

Tuberculous Lobitis in Children.—Radiographs taken before death, and compared with anatomical specimens obtained at autopsy, clearly demonstrate the lobar disposition that pulmonary tuberculosis in children may assume. The frequency of such types is relatively great, and although many of them heal spontaneously it is wiser to institute early artificial pneumothorax, in order to avoid general dissemination of the disease.—*Sur quelques aspects radioscopiques et anatomique de la lobite tuberculeuse chez l'enfant, Armand-Delille and Lestocquoy, Meeting, Soc. Méd. d. Hôp., December 2, 1927, reported in Prog. Méd., December 17, 1927, no. 52, 2086.*—*(U. E. Z.)*

Hilum Tuberculosis of Childhood.—This paper is based upon the examination of 50,000 school children between the ages of five and fifteen, and on Chadwick's experience as Superintendent of Westfield State Sanatorium (Massachusetts) with 300 beds for tuberculous children. *Terminology:* The term *hilum tuberculosis* is used to designate the juvenile type of tuberculosis, essentially a disease of the lymph nodes, the primary complex described by Ranke. *Diagnosis: 1: History:* Evidence of contact with an open case of pulmonary tuberculosis is very important, four times as many cases of hilum tuberculosis and twice as many of pulmonary being found among known contacts as among others. *2: Symptoms:* Undue fatigue, lassitude, anorexia, and nervous irritability are the most important. Cough and fever are unusual. *3: Tuberculin test:* A positive Pirquet or intracutaneous test is essential. If positive, the question of activity must be determined by symptoms and general condition. The percentage of reactors increases from 20 per cent at the age of five to 35 per cent at fifteen years. *4: X-ray:* No absolute diagnosis of hilum tuberculosis is possible without its aid, yet negative films do not eliminate it. Opaque shadows are cast by enlarged tracheobronchial lymph nodes only when they contain calcium, which is deposited only in case of tuberculosis. Slight changes in area or density of the hilum cannot be relied on. Large homogeneous shadows extending toward the periphery are due to inflammatory exudate following recent infection, and serial films over several months' intervals for one to three years show gradual absorption, leaving only a small calcified nodule. *Latent hilum tuberculosis* is a term applied to children without signs or symptoms, but who show calcified masses or nodules and give a positive tuberculin test. A lowering of resistance or intercurrent infection may activate such a case. *Incidence of Infection:* At the State Clinics nearly 30 per cent of children between five and fifteen reacted to the Pirquet test, but the group contained 16 per cent of contacts and many underweight children; hence it is not representative of the average. Nearly twice as many reactors occurred in the contact group, and one community extensively colonized by tuberculous invalids gave a high percentage. Underweight children showed a little higher percentage than others, and the urban group a little higher than the rural. Bartlett, at Framingham, found 33 per cent of reactors; the State Clinic, ten years later, 25 per cent among 520 Framingham children. For the ages five to seven years the Demonstration group showed 52 per cent, the State Clinic group 14 per cent. *Incidence of Tuberculous Disease:* In this specially selected State Clinic group, a diagnosis of hilum tuberculosis was made in 3.7 per cent, and 10.4 per cent were classified as suspects. These were reactors to tuberculin, in poor condition, but without definite X-ray findings. Noncalcified tuberculous glands will not cast definite X-ray shadows. Based on a few communities, where all children were tuberculin tested, the statewide average is estimated at 18 to 20 per cent infected. Among reactors in the clinics, 12.5 per cent were diagnosed as hilum tuberclosis, and 35 per cent suspects, so that nearly one-half needed special care or treatment. This is equivalent to nearly 10 per cent of school children below high-school age. Last year in Massachusetts 6.5 per cent of all deaths were from some form of tuberculosis, and 18 per cent were under twenty years of age. The adult type of tuberculosis, however, was found in only 50 of 25,000 school children, 1 in 500. *Prognosis:* Children with hilum tuberculosis who have sanatorium treatment

long enough to reach average weight, develop good musculature, and live the normal child's daily life without fatigue, have been found to remain well after discharge, provided home conditons are reasonably good. Roentgenographs taken at intervals will show a gradually increasing density of the nodules and tuberculous lymph nodes, as calcification and absorption occur. Calcification is not an assurance of complete healing, as there may be other noncalcified lymph nodes as well, and Opie believes that living bacilli persist in or about apparently calcified foci up to about the age of twenty. Very rarely has adult pulmonary tuberculosis supervened in children with hilum tuberculosis discharged from Westfield. Recently a study has been made of 3,800 college, normal-school and high-school students, mostly the former two types, and among these were found 231 with latent hilum disease (6 per cent) and 6 with pulmonary tuberculosis. An estimate of 9 to 10 per cent of incidence of hilum involvement in school children does not seem excessive.—*The Diagnosis and Prognosis of Juvenile Tuberculosis, H. D. Chadwick, Boston M. & S. J., January 26, 1928, cxcvii, 1399.—(A. P.)*

Diagnosis of Hilum Tuberculosis in Childhood.—On account of the difficulty and uncertainty of determining active bronchial lymph-node tuberculosis in childhood the author recommends three aids, a good history, testing with tuberculin, and roentgenography. The Mantoux test is preferred to the Pirquet. In cases with a negative Pirquet in miliary tuberculosis the Mantoux was positive. The various tuberculin tests are used, concluding with a percutaneous Moro test. When all these tests are negative, and severe cachexia and miliary tuberculosis and measles do not come into consideration, the diagnosis of tuberculosis can be fairly well excluded. Roentgenography can give earlier findings than other clinical methods. Other causes of the pathological hilum must be excluded. If all other possibilities are excluded and a positive tuberculin test is obtained the diagnosis of active bronchial lymph-node tuberculosis is considered certain. In doubtful cases the roentgen picture, taken repeatedly over a period of one-half to one year, will show changes. Active bronchial lymph-node tuberculosis is a rarer disease than generally considered. Of 132 cases so recorded, only 39, or 30 per cent, proved to be this condition. A hasty diagnosis is warned against. A single examination cannot justify a diagnosis. Only repeated clinical study can achieve the goal.—*Uber den Wert des Röntgenbildes bei der Diagnose der aktiven Bronchialdrüsentuberkulose im Kindesalter, E. Wahncau, Beitr. z. Klin. d. Tuberk., 1927, lxvii, 601.—(H. J. C.)*

Multiple Lymph-Node Tuberculosis and Polyserositis.—Meunier has had occasion to see the evolution of numerous grave forms of infantile tuberculosis, often very acute, but the one here reported presented exceptional features, and autopsy was available. It was a girl of 10 years, physically and intellectually retarded, who suddenly developed fever, rapid deterioration of the general state, increase in size of the abdomen, cough and dyspnoea. The condition was grave, there was marked cardiac dulness, and dulness over the right half of the thorax, with weak respiration and abdominal distention, giving the sensation of a fluid wave. In addition to the pericardial effusion and right pleural effusion there was tuberculous cervical adenitis. The course was rapidly fatal. Autopsy confirmed the previous clinical diagnosis, and also revealed an extraordinarily intense caseation of all the mediastinal and abdominal lymph nodes, and extreme invasion of the peritoneum, with numerous adhesions, but, withal, absence, at least macroscopic, of any visceral tuberculosis, either thoracic or abdominal. *Clinical Course:* At the beginning of hospitalization the clinical picture was attributed to broken cardiac compensation. There was, in fact, besides a notable increase in dulness, a slight systolic murmur with muffled sounds, tachycardia and weak pulse. The patient was given digitalis and purgation to no effect. During two weeks' observation the condition became worse, and fever was constant, although not excessive. The appearance of a cold abscess in the neck caused a revision of the first diagnosis, and tuberculous peritonitis was diagnosed. Laparotomy was practised, with evacuation of several pockets of fluid, which yielded a full litre. Multiple adhesions of the intestinal coils were found and the peritoneal cavity closed without drainage. Pericardial puncture, beneath the xyphoid, yielded 100 cc. of yellowish serous fluid, showing lymphocytosis, and negative on culture. Next day the child seemed slightly better, and the pulse was slower and stronger, but that night she became asphyxiated and died. *Autopsy:* This showed the pericardium strongly adherent to the left pleura and diaphragm; between the pericardium and pleura was a large caseous tubercle. The right parietal and visceral pleura were inflamed, haemorrhagic, thick, and adherent. The left pleurae were normal. The right lung

was intensely congested but showed no tubercles; neither did the left. The mediastinal lymph nodes were large and caseous, some partly calcified. The peritoneal layers were everywhere covered by an extraordinary number of tubercles, more or less softened, and the mesenteric and paravertebral lymph nodes were markedly enlarged and caseous. There were multiple loculated collections of fluid amid adhesions. There was found no intestinal ulceration. Other viscera failed to show tubercles. The subhyoid lymph nodes were caseous, and other cervical nodes slightly enlarged and congested. *Interpretation:* According to the history, tuberculosis presumably developed early in life. The child had been breastfed, and later for three years suffered from alternating diarrhoea and constipation, and at the age of six with digestive disturbance and abdominal pains. She probably first had tuberculosis of the mesenteric lymph nodes, and later peritoneal tuberculosis. Then came the terminal aggravation: the tuberculosis progressed within the lymph nodes, breaking them down, and overflowed to the peritoneum, evolving very acutely, but still restricted to the lymphatic system and serous membranes. There may have been a septicaemia during the last phase, but it could not be determined. Similar cases have been reported by Lesage and Pascal, in young infants, but are very rare. The tuberculin tests in this case were negative, as might be expected. It is also to be remarked that during the war cachectic cases of abdominal tuberculosis were observed to give negative reactions more frequently than the pulmonary or meningeal forms.—*Un cas de tuberculose infantile pluriganglionnaire et polyséreuse sans tuberculisation des viscères, M. Meunier, Rev. Belge d. l. Tuberc., March–May, 1926, xvii, 90.*—(*A. P.*)

Leucocytes after Tebeprotin Injections in Children.—Tebeprotin injections (0.03 to 0.1 mgm.) were given to 105 cases of tuberculosis of various grades as well as to children free from tuberculosis. The patients were examined for the percentage relations of the leucocytes. On the basis of the clinical findings they were classified into three groups: *1:* With no reaction to tebeprotin and Old Tuberculin. *2:* Positive reaction to Old Tuberculin but not to tebeprotin. *3:* Reacting to both. A lymphopoenia and shifting of the neutrophiles to the left were the associated symptoms of a positive reaction. It is concluded that the blood picture following the use of tebeprotin in children could only be used as an important prognostic aid in combination with other symptoms and clinical findings. A positive outcome of the blood reaction gives no conclusive information on the severity of the disease or on the certainty of its existence.—*Über die diagnostische Bedeutung der Blutbildveränderungen nach Tebeprotininjektionen bei Kindern, P. Schumowskyj, Ztschr. f. Tuberk., 1927, xlviii, 256.*—(*H. J. C.*)

Phlyctenular Keratoconjunctivitis.—A tuberculous focus somewhere in the body is the underlying etiological factor in phlyctenular keratoconjunctivitis; and phlyctenular keratoconjunctivitis is a local manifestation of hypersensitiveness of the individual to tuberculin. This manifestation is of the nature of an eczema of the cornea and conjunctiva, and tuberculin is the specific protein or substance to which hypersensitiveness has developed. Photophobia is usually the most pronounced symptom. Blepharospasm and lachrimation are also present. There is little or no pus. The lesions appear as small nodules at the corneal border, and it is the lesion in this region which is more likely to ulcerate. The elevated whitish patches usually have skeins of dilated capillaries leading up to them. One or both eyes may be involved. There is a marked tendency to repeated attacks. In children the condition may last for weeks, months, or even years. Most of the cloudy areas following the lesions clear completely. Desensitization is carried out by beginning with a dose much smaller than that necessary to produce a reaction (0.1 cc. of 1:1,000,000 O. T.) and increasing every third day until a dose of 5.0 mgm. (0.5 cc. of 1:100) is reached. A reaction may consist of a flare-up of the eye symptoms. During a year and a half, 18 patients with phlyctenular disease have been treated. In every instance partial relief of symptoms has begun immediately. In some cases the test itself has given relief. In all except one or two instances most symptoms have disappeared before completion of the four injections of the 1:1,000,000 dilution. Cure was effected in all cases except in a child of two who remained in a home where there was active tuberculosis, and who again became sensitive to tuberculin. At the end of the course of treatment the intracutaneous test was only slightly positive, or negative. In most of the cases described there has been a personal or family history of urticaria, eczema, hay fever, or asthma. The most common lesion in the patients themselves has been seborrhoeic eczema. Though general measures are of great value and must be employed, the early relief offered by tuberculin treatment warrants its use.—*Phlyctenular Keratoconjunctivitis, Its Etiology and*

Treatment, H. Casparis, Am. J. Dis. Child., November, 1927, xxxiv, 779.—(P. J. W.)

Primary Middle-Ear Tuberculosis in Infancy.—The author describes four cases of middle-ear tuberculosis in infants. He believes that the condition was primary. It is suggested that primary tuberculosis of the middle ear can originate from the mucous membrane, as it does in the intestine, and only later affect the region of the middle ear. The infection of the drum membrane occurs by way of the tube, and can originate *intrapartum* through aspiration of amniotic fluid containing tubercle bacilli or *post partum* from infection from an open case of tuberculosis in contact with the child.—*Uber primäre Mittelohrtuberkulose beim Säugling, M. Sarßl, Virchow's Arch. f. path. Anat., 1927, cclxvi, 274.—(H. J. C.)*

Pericarditis as Primary Clinical Manifestation of Tuberculosis in Childhood.—Pericarditis as the first clinical manifestation of active tuberculosis in childhood is rare. No such case diagnosed during life was found in the literature. Tuberculous pericarditis is usually secondary to some focus elsewhere in the body. It seems to bear a more intimate relationship to involvement of the hilum lymph nodes than to foci elsewhere. Infection occurs most commonly through the lymphatics or by direct extension through these hilum nodes. In generalized miliary tuberculosis the pericardium is involved less frequently than any other serous membranes. The more chronic types are characterized by large amounts of exudate. The effusion is most often serous. The onset of primary tuberculous pericarditis is abrupt, with the usual symptoms and signs of an acute pericarditis. The amount of effusion increases to a very large volume. The liquid is more often sanguineous in tuberculous than in rheumatic pericarditis, and, after removal, refills the sac with great rapidity. Culture, microscopic search, and guinea-pig inoculation give the conclusive evidence while the patient is alive. Skin tests are very helpful. The prognosis is very unfavorable. Besides the usual general therapeutic measures, repeated pericardial tapping is the only important method of treatment. The authors report the case of a colored boy of nine who had been in good health until two weeks prior to admission to the hospital, during which time he had had cough, and later an evening rise of temperature. Thirty-six hours prior to admission he was seized with sharp pain in the left side of his chest. The pain was aggravated by respiration. Examination showed a well-nourished, acutely ill child, with compression consolidation of the left lower lobe; the right border of the heart was one inch to the right of the right sternal margin, the left border just outside the anterior axillary line. Loud friction was heard over the precordium. Three days after admission the friction sounds were diminished and the heart-tones distant. Fifty cubic centimetres of blood-tinged liquid were removed from the pericardium. Later much larger amounts were withdrawn. Later the diagnosis of tuberculous pericarditis was confirmed by a positive Pirquet test and by guinea-pig inoculation of the pericardial fluid. Four months after admission the heart-tones were distant, and the heart enlarged, but without murmurs. The child died ten months after onset. At autopsy the findings were adhesive tuberculous peritonitis, generalized serositis with fibrinous deposits in the peritoneal, pericardial, and pleural cavities, tuberculous tracheobronchial, tracheal, retroperitoneal, and mesenteric lymphadenitis, miliary tuberculosis of the lungs, liver, and kidneys, and passive congestion of the lungs, liver, spleen, and kidneys. There is no question that the pericarditis provided the initial symptomatology in this case.—*Pericarditis as a Primary Clinical Manifestation of Tuberculosis in Childhood, M. L. Blatt and J. Greengard, Am. J. Dis. Child., April, 1928, xxxv, 631.—(P. J. W.)*

X-Ray Diagnosis of Abdominal Tuberculosis in Children with Pneumoperitoneum.—In earlier contributions the author reported on the value of roentgen examination in the knee-elbow position after the injection of oxygen into the peritoneal cavity in the determination of tuberculous abdominal disease in children. In the present study the sternberg mesenterial symptom was not found pathognomonic for mesenteric gland tuberculosis. There was no parallelism between the presence of pain points and the determination of tuberculous mesenteric lymph nodes in the roentgen pictures. In answer to the question whether there commonly were changes in the mesenteric nodes in children with a primary complex in the lung, bronchial-node tuberculosis, and incipient pulmonary tuberculosis indicating the entrance of tubercle bacilli through the intestines, there occurred only once enlarged and partly calcified mesenteric-node tuberculosis in 28 cases with pulmonary or bronchial-node changes. This would not favor the view of a primary deposition of the tubercle bacilli in the abdominal organs. Finally, it was found that tuberculous peritonitis almost exclusively causes adhesions, so that the roentgen findings were of differential diagnostic value

in distinguishing tuberculous peritonitis.—*Untersuchungsergebnisse bei Kindern mit Abdominaltuberkulose und Abdominaltuberkuloseverdacht bei Anwendung der pneumoperitonealen Röntgendiagnostik, P. Rupprecht, Ztschr. f. Tuberk., 1927, xlviii, 108.*—(*H. J. C.*)

Treatment of Tuberculous Peritonitis.—We must remember that a patient with tuberculous peritonitis has tuberculosis, and not consider his peritonitis alone. Hitherto, laparotomy has been considered the therapeutic measure of choice. But the most important factor of all is the reinforcement of the entire organism by helio-aero-therapy. We should stop talking of tuberculous peritonitis as if it were "surgical, local external." In a case of tuberculous peritonitis, we should: *1:* Begin with helio-aero-therapy, using ultraviolet rays in the absence of sunshine, treatment which is of value even if operation becomes necessary later. *2:* Follow up surgical procedure with heliotherapy or ultraviolet light treatment, plus general hygienic measures and rest, and continue treatment until there is no danger of recurrence.—*Doit-on appliquer à la péritonite tuberculeuse le traitement chirurgical ou médical? C. Brody, Arch. de Méd. d. Enf., January, 1928, xxxi, 5.*—(*P. J. W.*)

Primary Complex in Liver in Infant.—The findings in a 113-day-old infant, with strong positive Wassermann reaction and nodular tuberculosis of almost all the organs except the brain and meninges, is reported. In the right hepatic lobe there was a large well-encapsulated caseous lesion, exceeding in size all the others, and completely caseated tributary lymph nodes. The least-caseated nodes were the intrathoracics. In the intestine there was a recent tuberculous lesions in the ileum, with slightly involved tributary lymph nodes, as well as a number of caecal lesions without lymphatic involvement. There were tuberculous lesions in the vicinity of the gall bladder. Bacteriologically and biologically the case was tuberculosis. No spirochaetes were found. Microscopically the liver lesion was completely caseated, with a dense connective-tissue capsule of epithelioid and giant cells. The umbilicus and umbilical vessels were free from involvement. The rarity of the primary complex in congenital infection is viewed by the author as due to a passage through the placenta without reaction.—*Die Tuberkulöse Primärkomplex in der Leber. Ein Beitrag zur Kasuistik der kongenitalen Tuberkulose, M. Nordmann, Ztschr. f. Tuberk., 1927, xlvii, 193.*—(*H. J. C.*)

Red-Cell Sedimentation in Surgical Tuberculosis in Children.—The sedimentation test was performed by the Westergren method in 202 cases of surgical tuberculosis in children at monthly intervals, and in only 10 cases did the reaction fail to parallel the disease picture. In the remainder, curves were obtained which were of valuable prognostic aid, in that an increased sedimentation reaction in a series indicated abscess formation or a new focus prior to its determination clinically. Nephroses, with or without amyloid formation, were associated with a markedly increased sedimentation rate. As a rule, when associated diseases, such as tuberculosis of the internal organs or intercurrent diseases could be excluded, the sedimentation reaction paralleled healing, so that finally no children were discharged as healed in whom the sedimentation reaction was not normal.—*Über die Senkungsreaktion bei chirurgischer Tuberkulose im Kindesalter, F. Bier, Arch. f. Klin. Chir., 1927, cxliv, 432.*—(*H. J. C.*)

Prognosis of Joint Tuberculosis in Childhood.—Unbounded faith in the completely curative powers of heliotherapy in joint tuberculosis in childhood is to be deplored. The patient with joint tuberculosis must be considered to be a tuberculous individual in whom the joint is not the only, nor even the primary seat of this disease in his body. The X-ray shows that the existence of two separate foci of tuberculosis in the spine is fairly common. The work of Rollier and others on heliotherapy has shown this therapeutic measure to be of great and even unique value. But the view is held, particularly in this country, that tuberculosis of the joints is not truly cured and beyond the likelihood of recurrence, unless motion has been lost. We should recognize that we should not yield ourselves uncompromisingly to a program exclusively operative, nor yet to one exclusively nonoperative. Each case must be considered on its own merits.—*The Prognosis of Joint Tuberculosis in Childhood, A. H. Freiberg, Arch. Pediatr., May, 1928, xlv, 278.*—(*P. J. W.*)

Carbon-Arc Irradiation of Infants.—The effect of irradiation on respiratory infections, also on the haematopoietic and lymphatic systems was investigated in a group of nineteen infants, nine irradiated and ten controls. The study was divided into three periods, two of irradiation totaling three months, and one subsequent period comprising one and one-half months. The ages, weights and heights of both groups corresponded closely, and a preliminary

record was made of the blood findings. The carbon arc was used because its rays more closely approximate those of the sun than do the rays of the mercury-vapor lamp, and a thirty-minute exposure every other day was given, up to a total of twenty-two and one-half hours' irradiation. It was found that the incidence and frequency of respiratory infections were not influenced. In fact, the irradiated group had infections somewhat more often than the others. This result coincided with that obtained previously with the mercury-vapor lamp. It is possible, therefore, that certain solar rays which may have value in the prevention of infection are not sufficiently represented in the carbon-arc lamp spectrum. It was noted that pigmentation of the skin was disappointing, and of a different hue than the marked tanning subsequently obtained on exposure to the sun. At the end of the first period of irradiation the haemoglobin percentage remained unchanged in the irradiated group, there being a drop of 12 per cent in the nonirradiated. At the end of the second period a fall of haemoglobin was noted in the irradiated group, but not among the nonirradiated. This suggests a stimulating effect of the rays during the first period, which later passes off. The number of erythrocytes and leukocytes was not affected, but there was an increased percentage of polymorphonuclear cells during the first and second periods. Growth in weight and height during the first six weeks was greater in the irradiated than in the nonirradiated group, but during the second period growth was less among the irradiated infants. Irradiation failed to diminish the size of cervical lymph nodes observed in 60 per cent of the infants, and in some cases these even became larger.—*The Effect of Carbon Arc Irradiation on the Health of a Group of Infants, L. H. Barenberg and J. M. Lewis, J. Am. M. Ass., February 18, 1928, xc, 504.*—(*G. L. L.*)

Ultraviolet Rays in Treatment of Children.—The centuries' old saying that "Light is the life of man" is only now beginning to be fully appreciated. Newton, by his discovery of the spectrum, opened the path to the various fields of radiant energy. Ritter, in 1801, was the first to conclude from photographic experiments the presence of invisible "ultraviolet" rays. The shorter the wave-length, the greater the refraction. The presence of ultraviolet radiation can be determined by chemical reactions or fluorescence. The chief difficulty in using visible light as a source of heat is to obtain sufficient intensity of heat-penetrating rays without an excess of long wave-lengths which produce surface burning. The solar rays penetrate deeply and warm the blood-stream, while radiations from a stove are absorbed too near the surface. The near or soft ultraviolet rays are nonpenetrating, and absorbed by the skin; they are easily filtered out by dust or water-vapor, and largely so by ordinary window glass, but transmitted by quartz. They vary in intensity with the season. Lack of these rays will predispose to rickets and spasmophilia and possibly to other diseases. The probable explanation of why negroes and dark-skinned Italians are so prone to rickets in this country is that the pigment in their skin filters out many of the already diminished ultraviolet rays in sunshine. In New England it is possible to use direct sunlight in treating infants and children, but during the fall, winter and spring precaution must be taken to avoid loss of body heat. This difficulty may be overcome by the use of a quartz window or special glass. According to the report of the Bureau of Standards in Washington, D. C., the ultraviolet transmission of various glasses on the market is as follows: *Corex* (Corning, N. Y., Glass Works) transmits 91.4 to 91.8 per cent of total ultraviolet solar rays and undergoes no appreciable change on exposure. *Vitaglass* (English) transmits 50 to 60 per cent and, *Helioglass* (Vioray) about the same; both of these decrease in transmitting power on exposure, probably about one-half during the first year. *Cel-O-Glass*, a film of cellulose acetate on wire mesh, transmits about 30 per cent, this decreasing to 5 to 10 per cent after eight months' continuous exposure. However, it is cheap and easily replaced. These glasses should be ideal for nursery and hospital windows, although during the winter it is questionable whether the amount of ultraviolet solar radiation is sufficient to give them much value. Rollier, of Leysin, may be called the pioneer in solar therapy. The essential point of his technique is a gradually increasing exposure of various body areas until the entire body is exposed. Fresh air and rest also play a part. Rollier's best results have been obtained in surgical tuberculosis and rickets. In the New England Peabody Home, the infants are placed in a warm room, with the sunlight coming through an open window, or on a veranda or sunporch in a sheltered garden or yard. A sheet draped on three sides of a crib will do. Drafts must be avoided. In beginning the infant wears a diaper, band and shirt, the head and neck being protected by a sunshade, sheet or cotton hat. During June and September the bath is given in the middle of the day, during July and August preferably in the early forenoon and late

afternoon. Many patients with dark skins can tolerate twice the exposure in the normal table. Sunlight, when obtainable, is preferable to artificial light. However, Alpine Sun Lamps are used in the Out-Patient Department and Medical Wards of the Children's Hospital, and in the Infants' Hospital four Burdick Lamps are suspended from near the ceiling. Rickets and spasmophilia are particular indications and often associated. Tuberculosis of mediastinal and mesenteric lymph nodes has responded well, also psoriasis. It seems fairly certain that the average infant and young child in Boston gets insufficient sunlight during the winter months.—*Use of Ultra-Violet Rays in Treatment, with Special Reference to Children, E. T. Wyman, New England J. of M., April 26, 1928, cxcviii, 510.—(A. P.)*

Exposure of Children to Tuberculous Teacher.—It is believed that the observation period, reported by Geissler, on a teacher with open tuberculosis as a source of infection, was too short between the period of infection and examination of the children. The author examined 38 children in a class taught by a tuberculous teacher and, of these, 15 reacted to tuberculin, of which 3 sat in the front row and 3 in the second. In 4 of the students there was a possibility of a domiciliary infection, and in these cases there were sharply delimited calcified lesions in the hilum region. In the cases infected by the teacher there were widespread flaky shadows partly in the vicinity of the hila. In this class there were 32 per cent giving a positive tuberculin test, while in a class of 42 children under a healthy teacher there were only 9, or 21 per cent, Pirquet positive, and the tuberculin-reacting children were equally distributed throughout the class. Finally there was in the tuberculous teacher's class a case of fatal tuberculous meningitis.—*Tuberkulose-expositionsprophylaxe in der Schule, F. Gierthmühlen, Ztschr. f. Tuberk., 1927, xlix, 124.—(H. J. C.)*

Tuberculosis among Domestic Animals in Germany.—The extent of tuberculosis among cattle was, for 1904, 17.89 per cent; 1914, 23.41 per cent; and 1924, 19.59 per cent. Avian tuberculosis is on the increase. Tuberculosis in pigs remains fairly constant, being 2.46 per cent in 1904 and 2.02 per cent in 1924 among slaughtered animals. The Bang procedure is the only method by means of which bovine tuberculosis can be completely abolished, but it is not used in Germany.—*Die Verbreitung der Haustiertuberkulose im Deutschen Reiche und ihre Bekämpfung. Übersichtsreferat für die Zeit seit 1919, H. Haupt, Ztschr. f. Tuberk., 1927, xlvii, 130 and 212.—(H. J. C.)*

Human and Bovine Tuberculosis in Guernsey.—Prior to 1902 bovine tuberculosis was apparently unknown in Guernsey. This was the conclusion arrived at after persistently negative results were obtained on cattle with the tuberculin test by the United States Veterinary Department. However, in 1901 some cattle which had been sent to a show at the Agricultural Hall, Islington, were allowed by special permission to be brought back into Guernsey. Later these cattle were found to have active tuberculosis and relatively soon afterward an extensive outbreak of the disease occurred among cattle practically throughout the island. An ordinance was at once enacted, which required that all cattle be tested and that every animal reacting must be slaughtered and the owner compensated. During the ten-year period from 1910 to 1919, inclusive, the tuberculin test was done on 2,426 cattle. A positive reaction was obtained in 191 of these animals. During the three years 1924, 1925 and 1926, 2,882 animals were tested, and a positive reaction was found in only two of these. In regard to human tuberculosis in Guernsey no knowledge is obtainable of the mortality or morbidity prior to 1909. A comparison of human and bovine tuberculosis is made during the two periods, from 1910 to 1919, and in 1924, 1925 and 1926. During the ten-year period the population of Guernsey was 40,833, and the deaths from tuberculosis were 478; three hundred and fifty-seven due to phthisis and 121 due to other forms of tuberculosis. The percentage of deaths under five years of age to the total was, during this period, 8.5 per cent. During the three-year period the population was 38,650, and the number of deaths due to tuberculosis was 123, one hundred and three of which were due to phthisis and 20 to other tuberculous causes. There were only two deaths under five years of age, or 1.7 per cent of the total. Two tables are submitted indicating the selected mortality returns, and a third table which gives the point statistical returns regarding tuberculosis in human beings and cattle. Mention is made of the fact that no milk is imported, but there is a large import of butter. Mention is also made of the climate of Guernsey. For the past thirty-three years it has enjoyed an average of 1,901.5 hours of sunshine, said to be a record for the British Isles.—*Human and Bovine Tuberculosis in Guernsey, H. D. Bishop, Brit.*

J. Tuberc., October, 1927, xxi, 203.—(H. McL. R.)

Pathology of Pulmonary Tuberculosis.—Letulle reviews the history of the development of our knowledge of the pathology of tuberculosis, from Hippocrates through Silvius, Morton, Morgagni, Baillie, Bayle, Laennec, Louis, Villemin and Koch. A pathological classification and description then follows along these lines: *Chapter I. Tuberculous Miliary Granulations and Tubercles. Bronchopneumonic Tuberculosis:* Miliary granulations and miliary tubercles are differentiated and described. These begin to form in the subpleural cellulovascular tissue and subsequently undergo caseifying necrobiosis. A miliary nodule of 2 mm. diameter occupies the space of 110 to 120 alveoli, a miliary granulation about 5. A bronchoalveolitis is evoked in the contiguous respiratory passages. The miliary granulation is a plurifollicular nodule with giant cells developing in the interstitial and perivascular tissues. The bronchopneumonic miliary tubercle is the essential element of a lesion which may go on to the development of caseous pneumonia. Either caseation or fibrosis may occur in such a lesion. To sum up, the miliary tubercle is an island of bacillary bronchoalveolitis, a small focus of specific bronchopneumonia. *Chapter II. Bronchopneumonic Tuberculosis, Bacillary Bronchopneumonia and Caseous Pneumonia:* The first two terms are synonymous and have several aspects. First, there is the type with disseminated nodular islands and opaque soft masses exuding pus. Clinically the picture is of so called "galloping consumption." The source of invasion may be an ulcerating apical tuberculosis or there may be none discoverable. In "caseous pneumonia" there is a specific mortification and a granulofatty disintegration, with blocking of veins and lymphatics and a sclerohyperplastic panarteritis. Tuberculous pneumonia increases the size of the lung, in contrast to chronic fibroid tuberculosis. There is also an *acute tuberculous fibrinous pneumonia*, differentiated microscopically from nontuberculous pneumonia by the more lamellated and less finely reticulated character of the fibrin. True red hepatization and fibrinous alveolitis are more benign lesions provoked by the tubercle bacillus. Organization may occur similar to that of ordinary pneumonia, but autolytic destruction is more often observed, ending in suppurative dissolution. *Bacillary pulmonary splenization* is also of frequent occurrence and may be extensive. These areas may or may not contain tubercle bacilli, and may retrogress either slowly or rapidly. Tuberculous bronchopneumonia is subdivided into superacute, acute and subacute. Fibrous encapsulation is the most favorable termination, while excavation may occur quite suddenly. Even a cicatricial barrier may be broken through by the emprisoned bacilli, either directly or by means of a bronchoalveolitis with giant-cell development, or by invasion and dissemination through the vascular system. Suppurative disintegration and cavity formation may occur, usually with a marked polynucleosis and presence of many bacilli. Acute bacillary foci are surrounded by marginal zones of fibrinous pneumonia, a forerunner of progressive cavitation. *Chapter III. Chronic Pulmonary Tuberculosis. 1: Pulmonary Cavities:* The order of frequency of location is, first, the apex of one or both lungs, then the rest of the upper lobe, the upper part of the lower lobe, the middle lobe, and finally the base. Most cavities are near the surface, and the pleural serosa is thickened and often adherent. Centrally located cavities have their origin in the acute dissolution of bacillary pneumonia by disseminated islands of caseation or more rarely in a pseudolobar bronchopneumonic tuberculosis. Small cavities in the midst of confluent caseous masses, or scleroemphysematous tissue may escape the naked eye, or be mistaken for dilated bronchi or the reverse. Solitary cavities may occur at an apex or in a lower lobe. In the course of an acute phthisis the lung may be riddled with small cavities and present an extraordinary appearance. A cavity may be shut off by columns or septa compared by Laennec to those of the heart-wall (ventricle). These bands are the remains of interlobular septa. The communicating bronchus ordinarily debouches on the internal aspect of a cavity, either as an open canal, or in an oblique fluted manner. The contents of a cavity may be purulent, mucoid, caseous or gangrenous; in the latter case the odor is horrible. Blood is unusual in the absence of recent haemoptysis. Calcareous masses may occur. The bacterial flora may be exuberant. Anaerobic microörganisms are the most dangerous. The vegetating and thrombotic vascular changes are described, also cicatricial development about the wall. At times the differential diagnosis between a totally cicatrized cavity and a bronchiectasis presents great difficulty. The acute complications of cavities are pneumothorax and gangrene, chronic fistulization, and aneurysms of Rasmussen, first described in 1868. The latter are the source of origin of most large terminal haemoptyses, although simple ulceration of a pulmonary artery by

caseous infiltration may occur. Rupture of an aneurysm is not necessarily fatal, as clotting, organization and thrombotic obliteration may occur and eventually fibrovascular cicatrization. Hyperplastic endarteritis and hyaline degeneration also occur. *2. Bronchi in Pulmonary Tuberculosis:* Lesions of the trachea and cartilaginous bronchi are rare, but occasionally are widespread in the form of punctate or spreading ulcerations. In the hilar region ulceration and excavation may occur at the expense of a tuberculous peribronchial lymph node, especially in children. The smaller bronchi may present a variety of lesions, some of which are non-tuberculous. The tributary bronchus from an old cavity is nearly always thickened, hyperaemic and dilated near its outlet. The very small bronchi may be occluded by inflammatory elements or epithelial metaplasia, and the latter may be the site of origin of a neoplasm. Coëxisting syphilis may cause extensive bronchopathies, but caseation is practically pathognomonic of tuberculosis. *3. Pleuropulmonary Sclerosis in Tuberculosis:* The pulmonary scleroses are divided into (1) insular and (2) lobar. The former occur in nearly all chronic phthisis with cavity, especially at the apex, where the pleura is adherent and often pleated, and the subjacent shell hard, smooth and tinder-like. Anthracosis is commonly associated, also areas of atrophic atelectasis. *Fibrous Phthisis:* This type of lesion evolves slowly, emphysema is usually extensive and the right heart affected. Usually the pleura is adherent. *Lobar sclerosis* involves most often an upper lobe, where there are either encapsulated tubercles or a cavity or cavities. Syphilis and acute infections often give rise to a uniform lobar sclerosis, while in tuberculosis there is practically always some associated caseous change and also hyaline degeneration. There may be calcification, more rarely ossification. *Histologically, scleroses* may be *deforming* or *systematic.* The former develop rapidly about caseous foci, as concentric zones or irregular placques, interspersed commonly with emphysematous areas. *Peribronchial sclerosis,* when it occurs, is insular, and does not invade lymph nodes, cartilages and muscles, as in syphilis. The intralobular bronchi are most affected in tuberculosis, and the vascular system is affected as mentioned. Haemorrhagic infarcts do not characterize tuberculosis. The lymphatic vessels are involved, especially those in the subserosa and interlobular septa, with a sclerohyperplastic caseous lymphangitis. The interstitial tissue is especially involved in deforming scleroses, also the pleura, so that the lung surface has a wrinkled, folded or pleated appearance. Systematic scleroses are much less common; they may be extralobular or intralobular. In the former case the lobules are defined by fibrous bands radiating from the pleura and subserosa toward the hilum. There may be an intercalated perivenous nodular lymphangitis. There are probably always some caseous areas in which bacilli persist. *4: Lymphatics in Pulmonary Tuberculosis:* While the lymph-vessels show evidence of participation only by accident the lymph nodes show practically constant involvement, according to Parrot's Law. Adenopathies, caseous, peribronchial and mediastinal, are a part of the syndrome or picture of primary infection, and tuberculous adenopathy exercises a predominant effect in the evolution of infantile tuberculosis. Islands of caseous lymphangitis occur in bronchopneumonic lesions and at the hilum, and above it large nodes often stand out prominently. In the so called "bronchial phthisis" these nodes are encrusted with rough calcareous masses, amid which there takes place slow suppuration and fistulous communication with an air-containing cavity. The large node situated at the lower extremity of the trachea, in the angle between the bronchial bifurcation, may rupture into the oesophagus or a bronchial artery. Microscopic study of intrapulmonary or mediastinal lymph nodes often reveals the origin of an acute generalized miliary tuberculosis, showing invasion of a vein by a bacilliferous mass. Acute miliary tuberculosis is known to be often associated with caseous mediastinal adenopathy. *5: The Pleura in Pulmonary Tuberculosis:* This participates almost constantly in the lesions, and a pleurisy may act defensively to limit their spread. In acute miliary tuberculosis, although there are pleural lesions, exudative reaction is ordinarily lacking. In the less acute forms effusion occurs and tubercle bacilli are demonstrable therein. Subacute forms of pleurisy are characterized by the formation of false fibrinous membranes. Later there is a tendency to induration of the serosa, beneath which there may be caseous follicular masses, or even large blocks, which may calcify or ossify. The lung then becomes more or less collapsed and retracted, and held within a rigid shell. A caseous pachypleuritis may terminate in an oily liquid rich in cholesterin. Associated lesions are adhesive pericarditis, chronic mediastinitis and subdiaphragmatic peritonitis. Deformities of the hemithorax and dilatation of the right heart ensue. *Chapter IV. Evolution of Pulmonary Tuberculosis:* The evidence of the cutireaction and autopsy material indicates that in a large majority, perhaps 80 per cent, of cases, there

has been contact with tuberculosis in very early childhood. The lesions of primary infection occur usually in the lower and periplural part of the lung, as caseous bronchopneumonic nodules near the pleura. Such a *chancre of inoculation* is always accompanied by a peribronchial or mediastinal caseous adenopathy, conforming to Parrot's Law. This focus either becomes encysted, leaving the host well, or gives rise to generalized tuberculosis or caseous bronchopneumonia. In many subjects such primary lesions remain latent until puberty, when they may be awakened and embolize in a distant part, giving rise to an arthritis, meningitis or pulmonary tuberculosis. Other exacerbations follow at varying intervals and finally the diverse forms of adult pulmonary tuberculosis develop by endogenous reinoculation of these germs which entered in early childhood. According to whether the ulcerative or sclerotic tendency predominates the disease assumes malignant or benign forms. Ultimately the scleroemphysematous type of lesion predominates. Pregnancy very definitely affects the form and course of the disease, often exciting caseogenic foci to extensive activity. Tuberculosis may coexist with syphilis, malaria, leprosy, or rheumatism. In the last event Aschoff's nodules may be found in the foci of chronic tuberculosis.—*La tuberculose pleuro-pulmonaire, M. Letulle, Rev. d. l. Tuberc., February, 1927, viii, 5.—(A. P.)*

Mediastinal Deviations in Pulmonary Tuberculosis.—More or less marked deviations of the mediastinum and contained organs are quite commonly noted in subjects with pulmonary or pleural lesions, notably in cases of unilateral fibroid tuberculosis, and chronic adhesive pleurisy. They are almost always accompanied by a retraction of the wall of the hemithorax. This combined deformity results in an important diminution in volume of the corresponding lung, and this favors cicatrization. What is the mechanism of these mediastinal displacements? There appear to be two main factors: *1: The retractile tendency of the diseased lung and pleura:* This factor brings the mediastinum nearer to the wall of the hemithorax and explains its deformity as well as that of the costal frame work. *2: Pressure on the mediastinum by the sound lung,* which undergoes compensatory hypertrophy. Anatomically, the possibility of an increase in size of one lung, when the other is insufficient, is well demonstrated. It may take place quite rapidly. Sauerbruch has noted it within a few weeks after extrapleural thoracoplasty. It results not only from compensatory emphysema but also from a true hyperplasia or neoformation of pulmonary tissue. Gaillard and Bard emphasize the important rôle of this neoformation. Clinically it is impossible to differentiate these factors, but the practice of pneumothorax has added some information. In such cases, after the absorption of the gas pocket, it is the rule to observe marked mediastinal deviation. Rist and Hirschberg invoke the negative pressure in the residual pneumothorax as exerting an aspirating or suction effect on the mediastinum. An added evidence of the active rôle of the sound lung is the frequent lack of parallelism between the sinking in of the chest-wall and the degree of mediastinal displacement. In children deformities of the chest-wall are usually more marked than in adults, in whom it is more rigid. In these the increase in volume of the sound lung is especially noteworthy. In a case cited it represents more than one-third the volume of the normal organ. The reduction in volume of the diseased lung, especially if the left, as in the case cited, is still greater, due to sinking in of the ribs and ascent of the cupola of the diaphragm.—*À propos de la pathogénie des déviations due médiastin dans les affections pleuro-pulmonaires, E. Olbrechts, Rev. Belge d. l. Tuberc., March–April, 1927, xviii, 68.—(A. P.)*

Hilum of Lung.—The hilum is a wedge-shaped fossa on the mediastinal surface of either lung, through which passes the root or *radix pulmonis.* By common usage the term *hilum* has come to include the *radix pulmonis* and part of the lung closely adjacent. Thus hilum tuberculosis is tuberculosis of the *radix pulmonis,* and hilum pneumonia is especially a pneumonia of the lung closely adjacent to the *radix. Anatomy and Histology:* There are only a few pleural lymphatics which do not drain from the lung into the lymph nodes of the radix. In location the hilum is situated on the mediastinal surface of the lung, slightly posteriorly and above the middle. The root is formed by the bronchus, pulmonary artery and veins, bronchial artery and veins, pulmonary nerve plexuses, lymphatics, bronchial lymph nodes and areolar tissue. These structures are covered and bound together by a reflection of the pleura and thereby attached to other mediastinal structures. A narrow reflection of this pleura, the *ligamentum latum pulmonis,* extends downward along the mediastinal surface, and is attached to the diaphragm and pericardium. The lung normally rocks about the hilum, and transmits movements from the heart and great vessels. The upper lobes have a fairly broad attachment by means of their

rapidly branching bronchi, the lower lobes a very narrow one. The right lower-lobe bronchus divides to send a branch to the middle lobe. The pulmonary artery enters with the bronchus, situated inferior and posterior to it. As the artery leaves the *radix* it is superior and lateral to all bronchi except the uppermost right (eparterial bronchus). The artery to the lower lobe casts a heavy shadow on the radiograph, forming the lateral border of the radix. This shadow is often mistaken for the bronchus, which lies mesial to it. In the upper lobes the multiple ramifying shadows are more difficult to identify. The lymphatics in the hilar region may be roughly divided into mediastinal and bronchopulmonary. The *mediastinal group* may be further divided into (1) paratracheal and (2) tracheobronchial, the latter into (a) superior and (b) inferior. The *bronchopulmonary group* only are actually within the hilum and are more numerous than the mediastinal, into which they discharge. Infection from the lower lobes comes through the lower bronchopulmonary to the inferior tracheobronchial nodes, and from the upper through the upper bronchopulmonary to the superior tracheobronchial nodes. The outer bronchopulmonary nodes are of greatest radiographic importance, being most readily demonstrable. The other nodes lying along the root vessels or in the mediastinum are more apt to be obscured. There is a rich anastamosis between the lymphatics of the arteries, veins and bronchi and the various hilum lymph nodes, and infection may spread to the opposite hilum through the mediastinum. Certain groups of lymph nodes may be pathological, others not. The connective tissue of the hilum extends out especially along the artery and bronchus into each lobe, binding them together to form the linear markings on the radiograph. The mere presence of a lymph-node shadow means nothing unless we can say whether it is congested, fibrous or calcified. When this cannot be determined the clinical history is the best guide. The connective tissue increases greatly with age. Radiographically, the hilum shadows at birth are quite small, much more prominent at four or five years of age, and large and well defined in adult life. At birth there are no macroscopic lymph nodes in the hilum. *Pathology:* There are four major groups of diseases of the chest, namely, tumors, infections, circulatory disorders, and irritations. The lungs have lymphatic anastomoses with mediastinal lymph nodes, which in turn have connections with the head, neck, and abdomen. In most acute infections the lymphatic system has not time to respond and the lymph nodes, when present, are soft, congested, poorly visible and disappear with the recession of the primary infection. The tubercle bacillus, however, grows slowly, and there is notable lymphatic and fibrous reaction. The nodes tend to become discrete and more visible and paths of lymphatic drainage can be made out, except in the more fulminating, pneumonic, or advanced types with cavity. In bronchitis there is cough and sputum without much adenopathy. Upper respiratory-tract infections produce hilum changes closely limited to the *radix pulmonis*. Tuberculosis of the interior of the lung produces chains of lymph nodes radiating from the hilum. *Radiographic Technique:* The first problem is to portray accurately upon the radiographic film the anatomical structures with their pathological variations. Indefinite and vague descriptions usually mean vague and blurred films. Wasson has found the greatest single technical obstacle to be the intrathoracic movements which are mostly rapid and involuntary. Ruggles has made motion pictures showing well the rocking motion of the hilum. It is possible to make routine exposures of one-twentieth of a second and avoid this rocking. The voltage used is the only variable. The following should be clearly portrayed: bronchi at hilum; arteries; lymph nodes, if enlarged and not too soft; surrounding connective tissue and parenchyma. The right hilum is the more easily shown, the left being ordinarily obscured by the heart. The fluoroscope is also of value for gross pathology. *Effect of Infections:* Studies made during and following measles, pertussis, and other acute infections, show that after the congestion at the site of the acute infection subsides the hilar and lymph-node congestion follows suit; however, if any of these diseases assumes a more chronic form or there is chronic infection somewhere in the respiratory tract, there are definite and permanent hilum changes. *Differential Diagnosis:* The viewing of a large number of radiographs of typical tuberculous cases impresses one with the evidence of increase in size of the lymph nodes. The former are apt to be discrete, with some evidence of congestion, fibrosis or calcification, and there are radiating lines from the hilum, beaded in appearance. Clinically the patients are frequently underweight, show a slight and variable temperature increase, and, in the adult, malaise, in the child, nervousness. The typical nontuberculous case does not show these discrete nodes, but rather an evidence of connective-tissue increase, especially about the radix. The patients are more apt to be well nourished or overweight. Rise of tem-

perature is less striking, cough more so. In certain cases tuberculous and nontuberculous factors may be blended and shrewdness is necessary in evaluating their clinical importance. The group of irritants, including dust, closely simulates the infections, including tuberculosis at times. Interstitial fibrosis is characteristic. The enlarged nodes differ somewhat from those in tuberculosis. Central abscesses, near the hilum, may for a time be confused with pneumonia, but not for long. It is fortunate that most cases of tuberculosis showing clinical symptoms have fairly definite radiographic findings. If but one group of hilum nodes is involved tuberculosis is suggested, although Dunham believes there should be demonstrable connection with lesions in the interior. Mullen has demonstrated how infection may travel from the sinuses to the hilum by lymphatic connections. A radiograph with considerable connective-tissue increase about the *radix pulmonis*, without much enlargement of the outer bronchopulmonary lymph nodes and without radiating lines extending into the interior, looks like an upper respiratory infection, especially if there is sinus or tonsillar infection. Only occasionally does a tuberculous process cross the mediastinum to the opposite hilum. Woodhead's statement that catarrh and congestion of the bronchial mucosa prepare the soil for tuberculosis appears to be borne out. Certainly infections of early infancy may be seen to develop into the chronic ailments of childhood and adult life.—*The Hilus of the Lung, W. W. Wasson, Boston M. & S. J., February 9, 1928, cxcvii, 1493.—(A. P.)*

Seasonal Variations in Hilum Tuberculosis.—It was observed that both children and adults with tuberculosis of the hilum lymph nodes complain of aggravation of symptoms during summer. Children lose their appetite, and become ill tempered and easily fatigued. Adults complain of extreme fatigue and general malaise. These observations, which were verified statistically on a small group of patients, are in accord with the seasonal variation in tuberculin allergy, in the tone of the vegetative nervous system, in the incidence of tuberculous meningitis, and in the alkalescence of the blood. The symptoms are usually relieved by tuberculin therapy. Two cases are reported in which the seasonal aggravation was marked, in whom, however, neither X-ray findings nor physical signs warranted the diagnosis of tracheobronchial tuberculosis. Both patients were promptly relieved by tuberculin therapy.—*Ueber jahreszeitliche Schwankungen als diagnostisch verwertbares Symptom bei tuberkulösen Erkrankungen der Hilusdrüsen, H. Wagner, Wien. klin. Wchnschr., March 22, 1928, xli, 419.—(M. P.)*

Reticulo-Endothelial System.—A widespread misunderstanding is felt to exist regarding this system, which has called forth many papers. The conflict of opinion over relatively minor points has led to much confusion, and the literature has been filled with too many new terms and complicated theories. The object of this review is to clarify what is now for many a bewildering situation. Ranvier, in 1891, first described the powers of phagocytosis exhibited by certain free connective-tissue cells. Subsequently, Metchnikoff found that the large cells of the splenic pulp and lymph nodes, certain "endothelial" cells (for instance, Kupffer cells of the liver) and some of the large mononuclears of the blood were able to phagocyte actively. Ribbert in 1904, introducing certain dyes into the blood of living animals, found that not all the body cells were equally stained but certain cells absorbed most of the dye. Marchand believed these cells to arise from the local vascular adventitia, as do Lang and Sugiyama, recent workers. In 1913 Aschoff and Kiyono, collecting all previous observations, put forward the view that all these cells were anatomically and physiologically related, terming them the "reticuloendothelial system." This system comprises four groups, arranged according to function and morphology thus: *1: Reticulum cells:* large, pale-staining cells, found in the splenic pulp, cortical nodules and parts of the lymphoid system. *2: Sinus* or *endothelial cells*, such as line the lymph node sinuses, the blood sinuses of the spleen, the liver sinusoids, and the capillaries of bone marrow, adrenal cortex and hypophysis. *3: Wandering phagocytes of connective tissue*, described by Ranvier. *4: Mononuclear phagocytes of the blood.* In 1924 and 1925 Sabin and co-workers applied the "supravital" technique to the study of these last cells. Solutions of neutral-red and Janus-green were allowed to dry in a thin film on slides, upon which tissues or body fluids were then placed and sealed under cover-slips, and kept at body temperature under a microscope. These investigators concluded that two types of phagocytes, *monocytes* and *clasmatocytes*, could be distinguished, the former coming from a primitive reticular cell, the latter from endothelium. The monocyte was described as containing a collection of fine bodies, or rosette, staining with neutral-red and grouped about a clear centrosphere. The clasmatocyte was a larger cell, lacking rosettes or mitochondria,

and more actively phagocytic, especially in tissues. It has long been known that removal of certain organs, such as the spleen, markedly affects the formation of immune bodies, such as haemolysins, precipitins and agglutinins. It is also a fact that organs rich in cells of the reticulo-endothelial type are particularly good antibody producers. Gay and Morrison showed that the production of a large number of cells of this type, in a localized area such as the pleura, greatly increased resistance to local infection. Sabin's group of haematologists believe that the red cells arise from bone-marrow endothelium, whereas the white cells all originate from a primitive reticular cell. The endothelial bone-marrow cell, however, is also very phagocytic. In such diseases as typhoid fever, malaria and pernicious anaemia, all these cells are found packed with erythrocytes in various stages of disintegration. Recently Le Peline, Eppinger and others have shown that the cells of the reticulo-endothelial apparatus are the active agents in completing the change of haemoglobin to bile pigment, and finally, Rich has demonstrated the formation of urobilin from haemoglobin in pure cultures of these cells. Storage of iron pigment is related to these processes, and the cells of this system react with particular activity to certain specific infections, particularly tuberculosis, typhoid fever, leprosy and rheumatic fever; also to kala-azar, typhus fever, spotted fever, trench fever, measles and Oroya fever. In various clinical states characterized by hypercholesterolaemia, such as starvation and diabetes, these cells may become filled with a lipoid material and in diabetes may give rise to local xanthomatous tumors.—*The Reticulo-Endothelial System. A General Review, C. P. Rhoads, New England J. M., March 1, 1928, cxcviii, 76.—(A. P.)*

Functional Test for Reticulo-Endothelial System.—This study was undertaken in order to determine in what way the reticulo-endothelial system is influenced by tuberculosis. *Oleokoniol*, a 20 per cent emulsion of oil, was injected into healthy rabbits. Histological examination demonstrated the presence of oil droplets in reticulo-endothelial cells. The oil can be seen in the peripheral blood by dark-field examination; it appears similar to haemoconia. The rate of disappearance of the oil from the circulation constitutes an index of the power of absorption of the reticulo-endothelial system. Two to four cubic centimetres of the oil was injected intravenously into 17 patients with open, and 4 with closed pulmonary tuberculosis, and into 2 nontuberculous patients. Most patients complained of thoracic pressure, and sometimes of difficult breathing, immediately following the injection. Others had headache and backache. Some patients had a short chill with elevation of temperature. All these symptoms disappeared promptly and completely within a few hours. Blood was withdrawn from a skin puncture every five minutes for half an hour following the injection. The oil particles disappeared rapidly in all patients with chronic, nontoxic tuberculosis, indicating an increased phagocytic activity of the reticulo-endothelial cells. A slow disappearance was observed in all febrile, progressive, toxic lesions, suggesting that in such cases the reticulo-endothelial system is blocked and overworked.—*Zur Funktionsprüfung des Reticuloendothelialen Systems (Res) bei Tuberkulösen, R. Wigand and E. Heitz, Klin. Wchnschr., February 26, 1928, vii, 388.—(M. P.)*

Allergy and Reticulo-Endothelial System.—In attempts at blocking the reticulo-endothelial system, guinea pigs were injected intravenously with india-ink over long periods of time. In other animals the spleen was removed. In tuberculous animals so prepared, tuberculin shock was qualitatively and quantitatively identical to that in nonprepared animals. The histological findings produced by allergic reactions were unaltered.—*Tuberkuloseallergie und Reticuloendothel, W. Pagel, Klin. Wchnschr., April 8, 1928, vii, 700.—(M. P.)*

Physiological Rôle of Various Pulmonary Cells.—Functionally the lung has two circulatory systems, blood and aerial. While there is nothing characteristic about the blood capillaries the alveolar elements are interesting and variable in different species. In mammals we have, on the one hand, nucleated small cells and, on the other, large anucleated differentiated protoplasmic cells. It is well known that gaseous exchange is not the only function of the lung. Recently the small nucleated cells have been the object of special study: These show a considerable development of mitochondria (Granel) and numerous sudanophile globules (fat or cholesterin). An oxygen-reducing substance has been described by Hopkins in these cells, termed by him *Glutathion*. These cells are active in ingesting dust particles and have a phagocytic action, detaching themselves from the alveolar framework. Injection of oil into the trachea (Pélissier) causes these cells to hypertrophy and the oil disappears by virtue of the digestive action of a cellular lipase. Lewis and Carleton have cultivated pulmonary

tissue on coagulated rabbit serum, as have Binet and Champy. These cells can multiply rapidly by cell-division. They are essentially migratory, and secrete a proteolytic and fibrinolytic, as well as a lipolytic ferment. Roger and Binet have shown how the lung fixes and digests fatty matter in the blood-steam (*lipodieresis*) and that the afferent blood always contains more fatty matter than the efferent. Microchemical staining methods show that within a quarter of an hour fatty particles are taken up and their reaction to osmic acid altered. This power is not confined to the lung, the large mononuclear cells acting in the same way after subcutaneous injections. Margaret Lewis has shown that in the frog there exist in the circulation white cells which fix coloring matter and then reach the lung. Binet believes that it is the endothelial cells of the capillaries which act in this way, as does Foot. Pélissier has also remarked that there are lymphoid masses in the lung which may proliferate actively, as in certain cases of gas poisoning. Thus we have three types of cells, beside the alveolar, which may play an important physiological rôle: (1) nucleated alveolar, (2) endotheliovascular, and (3) lymphoid.—*Recherches récentes sur la physiologie du poumon, L. Binet, Rev. Belge d. l. Tuberc., March–April, 1927, xviii, 65.*—(*A. P.*)

Anatomical Development of Pulmonary Tuberculosis.—The author establishes four large groups as follows: (1) the isolated primary complex, (2) the purely secondary tuberculosis, (3) the tertiary tuberculosis with remnants of the secondary phase (secondary-tertiary), and (4) the tertiary tuberculosis. An examination of 250 cases on the basis of these four groups is recorded. The primary complex was observed in isolated form 4 times, in combined form 40 times, and was combined with favorable secondary types more frequently than with tertiary processes, so that the primary type could be considered as exerting a certain protective influence. The secondary processes are divided into disseminated, nodular and exudative types. The disease picture of the disseminated nodular pulmonary tuberculosis is little known, even though it was first described by Grau many years ago: 61 cases belonged in this group, of which 56 were of the fibrous nodular and 6 of more exudative nature. The secondary-tertiary mixed forms included 96 cases, 69 being productive and 27 predominantly exudative. Cases with sparse haematogenous foci rarely tend to the development of the genuine tertiary form. The infraclavicular infiltrates are included with the exudative secondary tuberculosis, and are found combined with active bronchial lymph-node tuberculosis and rare dissemination foci, and are observed on the roentgen plate as fine tissue strands extending towards the hilum. Early cavity formation is frequent, 24 of 27 cases revealing this. Besides the bronchogenic route of dissemination the haematogenous route is also considered important. For the development of the severe exudative secondary types of tuberculosis there occurs a repeated and marked infection and reinfection in the absence of a previous protective infection. Pure tertiary foci were found in only 89 cases, of which 47 were fibrous or fibronodular, 27 predominantly nodular, and 15 predominantly exudative. Over 50 per cent of the tertiary cases revealed indications of a previous secondary-stage process.—*Untersuchungen über die Entwicklung der Lungentuberkulose, Grau, Beitr. z. Klin. d. Tuberk., 1927, lxv, 461.*—(*H. J. C.*)

Criticism of Ranke's Classification of Tuberculosis.—Ranke's concept cannot be accepted uncritically as an established theory. It is necessary to test its adaptability to all facts. It is obvious that in tuberculosis three stages are not as clearly differentiated as in syphilis. An important difference between the two diseases must be recognized in the significant rôle which reinfection plays in tuberculosis. For this reason it may be more justified to speak only of a period of infection and of reinfection. Following the primary complex, whose anatomical characteristics are well and definitely established, isolated and generalized lesions may develop in irregular fashion. A differentiation into secondary and tertiary phenomena is impossible. The three types of allergy which Ranke defines for each of his stages, do not follow each other in chronological order. The phenomena which are allegedly characteristic for the secondary period may appear during the course of a tertiary phthisis. This indicates that a differentiation of three stages is impossible on the basis of allergic principles. Three large groups of tuberculous processes can be defined: the primary complex, generalized lesions (including generalizations closely in the wake of the primary period, that is, "early generalization," and "late generalization" or miliary tuberculosis), and chronic, isolated processes, limited to one organ Border-line types and combinations between the second and third groups are frequent. The pathogenesis of miliary tuberculosis cannot be explained by Weigert's mechanistic theory. In the course of a chronic, isolated tuber-

culosis, bacilli may circulate in the bloodstream without causing miliary lesions. The pathologico-anatomical type of miliary tubercle is definitely dependent on allergic conditions. The rupture of tuberculous foci into the blood or lymph-stream, as taught by Weigert, is not necessary for the development of miliary tuberculosis. The bacillaemia, which must always exist to cause miliary spread, does not lead to miliary lesions, unless conditions of disposition and allergy are favorable for such development. Weigert's vascular foci must be considered as consequences and not as causes of miliary tuberculosis. Lubarsch's criticism of the author's concepts in this regard are refuted with vehemence.—*Rankesche Stadieneinteilung und Miliartuberkulose, P. Huebschmann, Klin. Wchnschr., March 11, 1928, vii, 486.*—(*M. P.*)

Criticism of Ranke's Classification.—Even though Ranke's teachings have marked a great advance, objection is raised to his classification into stages, especially in the classification of lymph-node changes. In order to group late caseation with the whole picture of tuberculosis, on the basis of Ranke's stages, it is believed that a fourth stage becomes necessary. It is also suggested that Ranke's division into three stages be given up, and a *Primary* and *Reinfection* period be spoken of.—*Über Spätverkäsungen von Lymphdrüsen und über die Rankesche Stadieneinteilung, H. Beitzke, Ztschr. f. Tuberk., 1927, xlvii, 449.*—(*H. J. C.*)

Ranke's Second Allergic Stage.—Among 656 cases of tuberculosis in adults there were 528, or 80 per cent, with processes in the second allergic period of Ranke. The general conception of the harmlessness of apical lesions is warned against, as these can be the origin of those forms of phthisis which result in an endogenous spread from the pulmonary apices.—*Über den Anteil von Tuberkuloseformen der 2. Allergieperiode an der Lungentuberkulose des Erwachsenenalters, K. Krause, Beitr. z. Klin. d. Tuberk., 1927, lxvii, 363.*—(*H. J. C.*)

Clinical Forms of Ranke's Secondary Stage.—Special clinical forms of pulmonary tuberculosis are presented, which are included in the second stage of Ranke. The pulmonary apices show little change; on the contrary, there exists evidence of resistant pleuritic irritation, sometimes as dry pleurisy. Exudate-formation does not occur. There is dullness at the hilum, with harsh breathing. The temperature is subfebrile and the age of the individual varies between 16 and 30 years. Nervous symptoms are frequent. There occurs an obstinate disease course, but in the majority of cases there are favorable, although severe, infiltrative processes in the middle region of the lung. The disease picture was complicated by tuberculous bone conditions. The condition is considered to be a special type of tuberculosis, with extension along the lymph-channels, in which the hilum lymph nodes and the subpleural and pleural tissues play an important part.—*Über spezielle klinische Formen des sekundären genetischen Stadiums der Lungentuberkulose, O. Amrein, Beitr. z. Klin. d. Tuberk., 1927, lxv, 472.*—(*H. J. C.*)

Tuberculosis of Pulmonary Apices.—Tuberculosis of the pulmonary apices is far from being a genetic individuality. It can occur by the aerogenic route as a primary focus, which is rare; by the haematogenous route as isolated or multiple calcified metastases, or as a bland dissemination with secondary chalky cirrhotic transformation, which is frequent; and partly as a cirrhotic transformation of an infiltrative process of the secondary stage. All forms of apical tuberculosis tend to have an abortive favorable course, with the exception of the rare case of apically located early infiltration.—*Die Tuberkulose der Lungenspitzen, G. Simon, Beitr. z. Klin. d. Tuberk., 1927, lxvii, 467.*—(*H. J. C.*)

Assmann's Infraclavicular Infiltrations.—The author was the first to describe infraclavicular infiltrations as an incipient stage of progressive pulmonary tuberculosis (1922). These lesions are most frequently observed in young adults, and they are—in these cases—the first demonstrable manifestations of the disease. Progression is first shown by the appearance of small nodules around the first round infiltration. One such lesion was seen at autopsy. In accordance with the roentgenological interpretation, this lesion was an exudative pneumonic focus of the size of a cherry, centrally caseated and surrounded by productive nodules. The central caseation is emphasized because rapid central cavitation was frequently observed roentgenologically. This observation is an argument against Romberg's interpretation, who believes that infraclavicular infiltrations represent perifocal inflammations around old foci. The rapid cavity-formation is of eminent importance for the further development of the focus. Although heavy linear markings and enlarged hilum shadows are observed, roentgenological evidence of caseated lymph nodes is always lacking. For this reason

these lesions cannot be considered as primary foci. Furthermore, evidence of an earlier infection is frequently found. Such infiltrations are sometimes multiple, either apparently of simultaneous origin or they appear in short succession; this occurrence is interpreted as metastases by aspiration. In only two cases was a fatal outcome observed. Progression was noted only in such patients who refused the suggested treatment. Healing occurs by resorption and by induration in case of cavitation. It is pointed out that these early exudative processes, in contradistinction to later ones, are definitely benign. In regard to the pathogenesis of these foci, it is of interest that the majority of them were observed in medical students and in hospital attendants, persons who are likely to seek medical advice a great deal sooner than the average patient. The initial symptoms are slight with only moderate fever. Physical signs are absent or not characteristic. Initial haemoptysis occurred in a few cases. Most of these patients have been exposed to contact infection several months before the inception of the disease. This makes it probable that these lesions are produced by exogenous reinfections. Since simultaneous dissemination was never observed, it does not appear justified to consider infraclavicular infiltrations as manifestations of (Ranke's) secondary stage. In two cases in which a tuberculous infection through the skin had occurred, previous to the appearance of the pulmonary lesion, a haematogenous metastasis is possible. Diagnostically it is of importance to emphasize that these infiltrative lesions are observed in the absence of any apical foci. It is, however, not justified to disregard entirely small apical lesions in the pathogenesis of progressive pulmonary tuberculosis. Ordinary sanatorium treatment is sufficient treatment for many cases. If cavities do not shrink soon, and if bacilliferous sputum persists, pneumothorax is the indicated treatment. Early recognition and early treatment are essential.—*Über die Infraclaviculären Infiltrationen im Beginn der Lungentuberkulose von jugendlichen Erwachsenen, H. Assmann, Klin. Wchnschr., November 5, 1927, vi, 2128.*—(*M. P.*)

Ray-Fungus Tissue Reaction to Dead Tubercle Bacilli.—Ray-fungus forms were found in the lungs of rabbits injected intravenously with dead human tubercle bacilli which had been killed by heating for a half-hour in flowing steam at 100° or in the autoclave at 110°. The bacilli used for injection showed numerous clumps microscopically. The centre of the foci consisted of masses of well-stained gram-positive acid-fast rods and was surrounded by a wreath of radiating gram-negative eosinophilic balls. The bacillary masses were also seen enclosed in a glassy homogeneous zone, or in loose radiating arrangement. Since the bacilli had been destroyed before injection these changes are attributed to a lytic action. The clubs must be a product of the rabbit's tissues. The same explanation is possible for the origin of the gram-negative clubs of actinomyces. The subsequent homogeneous groundwork of the clubs is probably formed from the plasma of the giant cells in which the bacilli had lodged, possibly also originating from the exudate or cytoplasm of the histiocytes. The numerous leucocytes in the vicinity of the clubs also may possibly play a rôle. The club-reaction, since it appears to be a reaction form of the microorganism cannot, therefore, be considered to be related to the microbes.—*Kolbenkranzbildung um tote Tuberkelbacillen als Reaktion des Wirtsorganismus. Ein Beitrag zur Genese der Actinomycesformen, K. Meyer and E. Mayer, Ztschr. f. Hyg., 1927, cviii, 38.*—(*H. J. C.*)

Pulmonary Tuberculosis and Ossification of Costal Cartilages.—Reference is made to Freund's conception of premature ossification of the first cartilage predisposing to phthisis or to its localization at the apex; also to Moggi's study of premature calcification and the infantile habitus as factors, and to Städing and Mossing's findings of a "migration of calcium" from rib to cartilage and back, in the case of the upper ribs. The present study was made on 400 young soldiers, gone over by Rieux to detect latent tuberculosis, clinically, roentgenologically and bacteriologically (and serologically). It should be recalled that calcification of the costal cartilages is rare before thirty, but quite common by thirty-five. *1: Clinically Normal Persons:* These numbered 750, also checked with X-rays. Complement fixation was done on 260 and was positive in 35. In 14 there were anomalies in transparency of costal cartilages, generally symmetrical and bilateral. Only one of these had chest symptoms and his complement fixation was negative. *2: Those Showing Discrete Lesions in Roentgenographs:* These were in the form of streaks, flecks, or slight clouding or stippling, generally near or at an apex, sometimes perihilar. There were 63 such, in 48 of whom the costal cartilages were normal. In the others (15) some anomalies were discernible. *3: More Advanced Active Lesions:* There were 39 in this group, 30 of whom showed normal osteocartilaginous topography, only 2 exaggerated ossification of the cartilage, the other 7 some bony

decalcification. *4: Fibrocretaceous Lesions:* As shown by the X-ray, 17 of these were parenchymal in location and 15 hilum lymph-nodes, or 32 in all. Of these, 23 showed a normal osteocartilaginous picture, the others showing some exaggerated calcification. *5: Pleurisies and Sequellae:* There were 67 in this group, of whom 47 showed no anomalies. The others showed marked calcification or ossification, unilateral or bilateral. *7: Nontuberculous Pulmonary Affections:* There were 8 patients convalescent from pneumonia, 1 of whom showed bilateral cartilaginous calcification. *8: Observations during Evolution of Tuberculosis:* Nine such subjects were studied over six months. In all the cartilages and ribs presented throughout a normal appearance. *Interpretation of Results: 1:* Calcification of the first costal cartilage has never been observed accompanied by bony rarefaction of the corresponding rib, as maintained by Käding. *2:* Cartilaginous calcification occurs most frequently associated with pleuropulmonary scleroses, and this is especially true of very marked costal ossifications (40.4 per cent), whereas such were observed in only 9.2 per cent of those showing advanced tuberculous lesions, and in only 5 per cent of those with pleurisy. *3:* It is accordingly concluded that costocartilaginous calcification accompanies pulmonary cicatrizations and dense pleural organizations and that while quite frequent in the early phases of pulmonary tuberculosis it cannot be considered an index of latent tuberculosis. In advanced active tuberculosis it is rarely seen. *4:* A study of its possible relation to prognosis might well be undertaken on sanatorium material. —*Tuberculose pulmonaire et ossification des cartilages costaux, G. Chaumet and Zawadowski, Section d'Études Scientifiques de l'Oeuvre de la Tuberculose, May 14, 1927, reported in Rev. d. l. Tuberc., August, 1927, viii, 575.*—(*A. P.*)

Cavities in First Years of Life.—Contrary to clinical observation the pathologist finds cavities quite frequently in infants and young children. The contradiction is explained on the basis of the fact that the cavities consist mainly of small liquefactions which are difficult of clinical determination, while isolated cavities with induration are rarely seen at this age.—*Über Kavernen in den ersten Lebensjahren, A. Eckstein, Ztschr. f. Tuberk., 1927, xlviii, 97.*—(*H. J. C.*)

Roentgenography of Healing of Cavities.—It is necessary to distinguish between healing of the cavity wall and healing of a cavity. The former process is a transformation of the granulation tissue into fibrous tissue, leaving a clean, nonsecreting cavity. The latter process is a complete disappearance of the cavity itself. This may occur in four different ways. The most frequent mode of cavity healing in tertiary tuberculosis is by fibrous shrinkage. The result of this process is an irregular, dense, often stellate scar which can be recognized roentgenologically. An entire upper lobe may shrink in this way, and, if the interlobar fissure be demonstrable, one can observe the upward migration. Another mode of healing is by apposition of the cavity walls, that is, by collapse; this occurs most frequently under collapse therapy when the natural elasticity of the lung tissue is released. This results in a straight scar. If this type of healing occurs spontaneously it is usually associated with pronounced shrinking and shifting of the mediastinal structures. The third way of healing is the resorption of exudation around a fresh cavity before fibrous tissue has formed in its wall. This process is observed during the secondary stage and almost only in small cavities, and no visible scars are left. Small cavities may further heal by complete transformation into fibrotic, and later on calcified, nodules. Thick, round shadows are the roentgenological remnants in such cases. In a general way, the best healing tendencies are in those parts of the lungs where the maximal possibility for shrinking exists, that is in the upper lobe. The size and the age of the cavity are significant factors in healing.—*Kavernenheilung im Roentgenbild. J. E. Wolf, Klin. Wchnschr., May 6, 1928, vii, 899.*—(*M. P.*)

Formation of Annular Shadows.—Five cases of subpleural emphysema are reported as a causative factor in the formation of annular shadows. The roentgenograph of these shadows are seen as rounded or irregular areas of decreased density, with rather thin dense linear outline. Most of these shadows occur in or near the base of the lung, although they may be seen in the upper portion of the chest. They do not ordinarily show the characteristics of a true cavity and, in addition, are frequently not associated with pulmonary tuberculosis. Evidence of generalized pulmonary emphysema is seen in most of these cases.—*Subpleural Emphsyema as a Causative Factor in the Formation of Annular Shadows, H. P. Daub, Am. J. Roentgenol. & Rad. Ther., July, 1928, xx, 6.*—(*W. I. W.*)

Annular Shadows.—In the main, annular shadows are due to pleural adhesions,

pneumothorax and cavities. Only shadows over 1.5 to 2 cm. in diameter, should be considered as "annular shadows." Smaller rings of 2-mm. diameter, lying mostly in the hilum region, are due to crossing vessels and bronchi. The delimitation of the annular shadow can be variable. At times the ring may be evenly contoured, at other times there is a dense, sharply delimited inner and a more dense outer annular shadow. At times the ring may not be completely closed, or it appears to be made up of numerous smaller conglomerated circular formations. If a strand-like formation exists between the ring shadow and the hilum, according to the view of Turban and Lydtin this certifies a diagnosis of cavity, the strand-like formations being the drainage-channels of the cavity. But the author believes that they may be due to an infiltration of the lymph-channels analagous to the lymph strands between the primary complex and the lymph nodes. Against Turban's view is the fact that it is extremely difficult to fill the cavities with iodol. In agreement with Turban the author emphasizes the constancy of the ring shadows, contrary to Brown and to Amberson, who speak of their transitions and rapid appearance and disappearance as characteristic of the shadows. Roentgenography is of decisive significance in localization. Pleural and pulmonary processes may be differentiated by determining their depth, using various types of raying, pictures taken in numerous positions, or stereoscopic views. In differential diagnosis pleural fibroses and adhesions and spontaneous pneumothorax are to be considered. In the latter case the clinical history is of value. The inadequacy of iodipin filling is pointed out. The author concludes that almost all annular shadows are cavities. All annular shadows are of other origin when this can be definitely proved, and not when there is a paucity of clinical symptoms or when the disappearance of the shadow is only surmised.—*Was liegt den Ringschatten im Lungenröntgenbild zugrunde? Eine differentialdiagnostische Betrachtung, W. Curschmann, Beitr. z. Klin. d. Tuberk., 1927, lxvi, 507.—(H. J. C.)*

Pulmonary Fibrosis.—Pulmonary fibrosis of nontuberculous origin frequently produces grade disability and seriously reduces the subject's economic efficiency; a reasonable proportion of patients establish an "immunity," and labor under no apparent disadvantage. Fifty-three patients were classified from an economic viewpoint. The term "fit" is used to imply the capacity of an individual for a normal useful life. There were *1:* Fit without signs or symptoms, 9 or 17 per cent. *2:* Fit, but with physical signs, and without impairment of general health, 16 or 30 per cent. *3:* Not fit, and with physical signs, permanent injury to lung tissue accompanied by some degree of constitutional disability, 23 or 43 per cent. In 5 or 10 per cent, bronchiectasis has supervened since the last examination. Pulmonary fibrosis is a not infrequent consequence of the protracted form of bronchopneumonia which follows measles and whooping-cough. The protection against measles and whooping-cough in the first five years of life would tend to prevent its incidence.—*Pulmonary Fibrosis, C. D. Kitcat and T. H. Sellors, Brit. M. J., June 16, 1928, no. 3519, 1018.—(W. I. W.)*

Origin and Disappearance of Amyloid.—Amyloidosis cannot be diagnosed with absolute certainty by clinical signs and symptoms. A definite diagnosis can be made by puncturing the liver with a needle having an internal diameter of 1.5 mm., and by examining histologically the plug removed by this procedure. This method was used repeatedly on 10 patients with bone or joint tuberculosis. In 3 patients who had far-advanced amyloidosis, the spontaneous disappearance of the amyloid infiltration could be followed. Amyloid disappears when the cause for its production is removed. As long as there is any purulent secretion, amyloid persists. The suppuration must be present for a considerable length of time, usually from one to two years before amyloidosis occurs. Advanced amyloidosis may exist in the kidney without albuminuria, and in the liver without demonstrable increase in size of the organ.—*Über das Entstehen und Verschwinden des Amyloids beim Menschen, H. Waldenström, Klin. Wchnschr., November 19, 1927, vi, 2235.—(M. P.)*

Fibrin Bodies in Pneumothorax Space.—Postmortem findings are recorded, in the case of a woman, 38 years of age, in which yellow thick caseous-like masses were found in the pneumothorax space, which histologically proved to be composed of pure fibrin. They contained no blood pigment, no bacilli and no fibrin balls, for which reason the author opposes the conception that they resulted from a haemorrhage, but rather as a direct formation of fibrin masses out of an exudate.—*Fibrinkörper in Pneumothoraxraum (Obduktionsbefund), L. Wischnowitzer, Beitr. z. Klin. d. Tuberk., 1927, lxvii, 773.—(H. J. C.)*

Fibrin Bodies in Pneumothorax Space.—In three cases reported by the author, in

which there was an exudate following pneumothorax, there were floating bodies found in the pleural space. In addition to these three cases, the author points out that there have been seven others of similar type reported and in nine of the total there had occurred an exudate, while in only one this was not present. In the latter case, reported by Düll, it is believed that the floating bodies resulted from needle injury to the intercostal artery, with consequent haemorrhage.—*Freie Körper in der Pleurahöhle, P. Mende, Beitr. z. Klin. d. Tuberk., 1927, lxvi, 293.*—(*H. J. C.*)

Tubercle in Adenoma of Liver.—At postmortem there was found a large adenoma in the liver in a 63-year-old man, in which were tubercles of varying age, while the rest of the organ was free from tuberculous changes. The view is expressed that the primary liver adenoma proved a favorable place for the deposition of tubercle.—*Über die sekundäre Ansiedlung von Tuberkeln in primär erkranktem Gewebe (Tumor and Osteomalacie), E. Bersch, Centralbl. f. Gyn., 1927, li, 3170.*—(*H. J. C.*)

Constitutional Effects of Tuberculosis.—The importance of the capillary endothelium in infectious diseases is emphasized. Thus, there is a relation between tuberculosis, typhoid fever and scarlet fever, in that the former makes the soil more suitable for the latter two and leads to a more severe course. Vaccine lesions from cowpox lymph were also found to be more severe in children with tuberculosis, and the same thing occurred in association with diseases such as rickets and spasmophilia.—*Über Konstitutionsschädigungen durch Tuberkulose, S. Budai, Beitr. z. Klin. d. Tuberk., 1927, lxvi, 195.*—(*H. J. C.*)

Absorption of Hydropneumothorax Exudates.—The pleural exudates which complicate artificial pneumothorax must be considered as true tuberculous pleurisies. This opinion is based on the biological study of the fluid and on the pathological anatomy of the pleura and especially on the clinical evolution of these exudates. These exudates dry up in a very specialized way, which is absorption by the base. Generally, the welding of the two pleural layers begins at the base of the thorax; the inferior lobe immersed in the liquid gradually expands, spreads on the cupola of the diaphragm, and makes contact with the parietal wall. Little by little the adhesion grows upward, and by this means causes the fluid-level between the pleural layers to rise. The causes of this are: First, a sedimentation of the flakes of fibrin. Second, this fibrin is organized, the fluid is pushed upward, and the lung expands and is drawn toward the chest wall. Clinically, the onset of the absorption is extremely difficult to define. It can only be said to have begun when the maximum fluid-level was attained, the clinical symptoms attenuated, when the temperature falls and the general condition improves. Lowering of the fluid-level, as shown by X-ray, is not the first evidence of absorption. When this is evident, many phases in the absorption have long since taken place. When the fluid-level is stable, absorption may already be occurring and in certain cases a rising of the fluid-level can be the most evident clue of the absorption of the pleural effusion. The variations of the fluid opacity are more reliable guides than the alterations of the fluid-level. As absorption goes on, and if the lung remains well collapsed, the fluid density lessens and is changed into a simple grill, which gradually clears and through which the outline of the ribs and diaphragm again becomes visible. If an exploratory puncture is made and if the fluid-level remains about the middle of the hemithorax, one can demonstrate reduction in the capacity of the pneumothorax (50 or 75 cc. instead of 600 or 800 cc. of air) and strongly positive manometric reading such as −3 to +20 with 50 cc. of air. As absorption continues the capacity of the pocket may increase, but the curve of the dynamic pressures tends always toward the vertical following the definite loss of elasticity of the walls of the pneumothorax space. Out of 20 observations it was impossible to detect definitely the beginning of absorption in 13; it was determined in the other seven. There are a number of X-ray pictures, some with lipiodol, illustrating the mechanism of absorption. *Conclusions: 1:* The evidence gathered from serial X-rays, repeated punctures of fluid, autopsy findings, and lipiodol injections warrants the opinion that effusions which supervene in the course of an artificial pneumothorax are generally absorbed according to a highly specialized procedure. *2:* These exudates are absorbed by way of the base. *3:* This phenomenon is brought about in several stages. First the fibrinous flakes are sedimented into the phrenicocostal sinus. The latter is obliterated. Soon the bottom of the pleural cavity becomes more or less chalice-shaped. Later the fibrin organizes. This is the onset of a contracting adhesion, which progressively encroaches on the pleural cavity by the bringing together of its inferior walls. As the inferior limit of the pleural space grows upward it pushes in front of it the fluid level. *4:* It is not the upper level

of the fluid which descends. On the contrary it is the bottom of the pleural cul-de-sac which seems to remount progressively toward the upper fluid level. *5:* The practical significance of this phenomenon is as follows: The adherence of the lung to the chest-wall in the course of an effusion always commences at the base. This is of little importance if the apical lesions remain well collapsed. On the contrary, it is dangerous in basal lesions. On the other hand, if tapping of the effusion is indicated, the operator should avoid puncturing at the lower levels of the fluid. The needle point may lodge in the midst of fibrin flakes, or in an adherent zone, the result being a dry tap. The site of election for puncture is preferably a little above the middle of the fluid. To be efficacious, successive punctures should be made higher and higher. Finally, if after a hydrothorax a phrenicotomy is being considered, it must not be forgotten that it is likely to be ineffective, because the diaphragm becomes strongly fixed in the block made above it by the lung, the chest-wall and the old adhesions resulting from the precocious absorption of the effusion by the base.—*Étude de la résorption spontanée des pleurésies au cours du pneumothorax artificiel* (*La résorption par la bas*), *E. Leuret and J. Caussimon, Ann. d. Méd., January, 1928, xxiii, 51.*—(*B. T. McM.*)

Proteases of Pleural Exudates.—Gay and Clark observed recently that a mixture of aleuronat and starch, injected intrapleurally, produced after eighteen to twenty hours an inflammatory exudate with cells largely of the polymorphonuclear variety (polymorphonuclears, 90 per cent, and clasmatocytes or histiocytes, 10 per cent). After three days the mononuclears predominate. Neither of these exudates were bactericidal for streptococci *in vitro* unless the leucocytes were immediately removed by centrifugation. The bactericidal action of the supernatant fluid was destroyed after heating for one-half hour at 73°C. and by allowing it to remain in contact with the cells for five hours. It was not altered after heating for one-half hour at 56°C. Since no immunological explanation could be found for these phenomena, it was thought that a study of the chemistry of the enzymes and so called antienzymes of these exudates would help in the interpretation of these facts, and thus throw some light on the mechanism of immunity during the course of a streptococcus infection of the pleural cavity. Opie has shown that the enzymes of the polynuclears, obtained from the pleural exudates of dogs and rabbits, is a leucoprotease active in neutral and alkaline solutions, and of the mononuclears, a lymphoprotease active in weakly acid solutions. He also found that the cell-free fluid inhibited the action of these enzymes. This inhibitory substance is diminished in the later stages of the inflammatory process; it is destroyed *in vitro* on prolonged standing, by heating to 70°C., or by rendering the reaction acid, and increased alkalinity favors its inhibitory power. This was observed not only with exudates obtained by injection of aleuronat but also with the *Streptococcus pyogenes*. Using the more recent physicochemical methods Opie's observations were confirmed and extended. In the following experiments attention was confined to the polymorphonuclear proteolytic enzymes and the rôle of hydrogen-ion concentration in controlling the mechanism of enzyme antienzyme was studied. *Methods:* The exudates were prepared by the technique of Gay. Young, healthy rabbits, weighing 1800–2000 gm., were injected in both pleural cavities with 5 cc. of sterile 5 per cent aleuronat in 3 per cent starch previously warmed to 37°C. The animals were killed by bleeding from the carotid artery, and exudates were removed by opening the thoracic cavities. The exudates were usually straw-colored, occasionally slightly bloody, and at times clotted in the test-tube. The clots were broken up, and the fluids pooled and centrifugated. The supernatant fluids were drawn off, and the leucocytes washed once with physiological salt solution, centrifugated, and extracted in distilled water for eighteen hours at 12°C. in the presence of toluene. Two per cent Fairchild's peptone or Cooper's powdered gelatine were used as subtrates. The pH was adjusted by the colorimetric method. Buffer salts were not used because of their retarding effect on enzyme action. The enzyme material from 6 to 8 rabbits was diluted to 200 cc., and 5 cc. of this was added to 5 cc. of substrate. The control tubes contained 5 cc. of water in place of enzyme or substrate solution. Digestion was carried out in the presence of toluene at 37°C. The amount of proteolysis was determined by Northrop's modification of Sorenson's formol titration method. The following points were studied: *1:* The determination of the pH range for the digestion of peptone by extracts of rabbit leucocytes. *2:* The self-digestion of the various elements of the exudates, acting together or individually, and when gelatine was added as substrate for the proteolytic enzymes. *3:* The behavior of the so called antiferment substances in the exudates with varying pH. *Summary:* The extracts of rabbit leucocytes can digest peptone between pH 5 and pH 8.

The optimum is at pH 6.5. The supernatant fluid and whole exudate show optimum digestion at pH 7.0 to pH 8.0, respectively. Using gelatine as substrate, the leucocytes and supernatant fluid show peptic activity at pH 3 and tryptic action at pH 8. The hydrolysis of gelatine by the supernatant fluid or whole exudate decreases when these enzyme solutions are undergoing active autolysis. The enzymes seem to digest the proteins with which they are associated rather than the gelatine. When the supernatant fluid is added to the previously sedimented leucocytes there is definite mutual inhibition of digestive activity during the first twenty-four hours, followed by a continuous rapid rise of the curve suggesting mutual rëenforcement. The curves of autolysis of these solutions do not show this phenomenon. Opie's observation that the supernatant fluid of an inflammatory exudate contains a substance (antiferment), which inhibits the proteolytic action of the leucocytes, is confirmed. There is also a reciprocal inhibition; namely, the leucocytes inhibit the action of the enzymes of the supernatant fluid. This mutual inhibitory action is evident between pH 8 and pH 5, and ceases abruptly on the acid side of pH 5. At this point the total digestion of gelatine by the supernatant fluid and the leucocytes acting together is much greater than the sum of their separate actions. It is suggested that the compound, which is formed between the inhibiting substance and the enzyme dissociates at the isoelectric point of the serum albumin, with which the so called antitryptic substance in rabbit plasma is associated.—*The Proteases and Antiproteases of Pleural Exudates, C. Weiss, J. Infect. Dis., December, 1927, xli, 467.*—*(F. G. P.)*

Vital Capacity.—This paper presents the results of a study of the vital capacity of Chinese students, similar socially to the American groups studied by Hastings, Baldwin, Hitchcock and others. These students have an average height of 168 cm. and an average ponderal index, in metric units, of 22.4. *Summary: 1:* Surface-area of the body, computed according to the method of Dubois, offers the criterion which correlates the height with vital capacity. *2:* Owing to the curvilinearity of all too variable correlations, multiple regressions were not reliable. *3:* The probable error of the deviations from the "normal" approximated 8.8 per cent of the mean for all ages and 6.8 per cent for college students. *4:* Chest expansion gave low correlations with vital capacity when both were corrected for height. *5:* There is slight but positive relationship between vital capacity and overweight and underweight. *6:* Tables are presented for ascertaining vital capacity norms for Chinese students from South China and from Eastern Central China. *7:* South China students show a larger vital capacity before pubescence and a smaller vital capacity after puberty than is the case for students of East Central China. This is found only for men students, as data for women students of South China were lacking. *8:* College students of both sexes show a slightly larger vital capacity than do elementary and high school students. *9:* The vital capacity of Chinese students of East Central China compares favorably with that of American students of both sexes, except that vital capacity of the American college women exceeds that of the Chinese college women to no small degree. *10:* It is thought probable that there are regional variations in vital capacity which may vary more within one nation than would be the case with similar groups of different races.—*Vital Capacity of Chinese Students, C. H. McCloy, Arch. Int. Med., November 15, 1927, xi, 686.*—*(W. I. W.)*

Chemical Studies in Tuberculosis—The purpose of this work was to ascertain a possible relationship of the plasma proteins, cholesterol and corpuscle volume to the different stages of tuberculosis. Single determinations were made on 71 patients, and repeated determinations on thirty-eight. *Conclusions: 1:* The cell-volume is usually below normal, especially in active cases with much emaciations. *2:* The size of the erythrocyte is decreased. *3:* The cholesterol content of the blood may be increased or decreased. *4:* A rising or stationary hypercholesterolaemia indicates resistance and immunity, while a falling hypercholesterolaemia or a hypocholesterolaemia represents a lowering in resistance and immunity. *5:* Fibrinogen is increased in proportion to the amount of tissue undergoing destruction. *6:* The globulin values are definitely increased, associated with a smaller percentage decrease in the albumin. *7:* The total serum proteins are normal or hypernormal, the increase being due to the high fraction of globulin.—*L. Eichelberger and K. L. McCluskey, Arch. Int. Med., December, 1927, xl, 831.*—*(W. I. W.)*

Amino-Acids in Tuberculosis.—In about 200 patients with pulmonary tuberculosis, the amino-acid nitrogen of the blood was determined according to Folin's colorimetric method. The results were not strictly related to the clinical picture, but increased values were found frequently in

patients with recent processes and with exacerbations, and low values were often observed in patients with cachexia and chronic undernourishment.—*Über den Aminosäurespiegel im Blut bei Tuberkulösen, L. Hantschmann and M. Steube, Klin. Wchnschr., April 1, 1928, vii, 637.—(M. P.)*

Amino-Acids in Tuberculosis.—In continuation of previously reported studies on the amino-acid content of the blood in tuberculosis, its excretion was studied in four tuberculosis patients. A regular correlation with the amount of protein intake could not be established. The maximum excretion occurred with regularity one and one-half hour after the midday meal, while the lowest values were found in the urine voided during the night. There was a frequent parallelism between amino-acid and uric-acid excretion under purine-free diet. The excretion increased with increasing concentration in the blood. The relative independence from the nitrogen intake, and the remarkable constancy of the daily amount, suggest that the main part of the urinary amino-acid is probably derived from endogenous metabolic processes. In early tuberculous lesions and in acute exacerbations, both blood and urinary amino-acids increased. The quotient $\frac{\text{amino-N}}{\text{total N}}$ in the urine increased with increasing amino-N in the blood.—*Über Aminosäureausscheidung im Urin bei Tuberkulösen, L. Hantschmann and M. Steube, Klin. Wchnschr., May 27, 1928, vii, 1037.—(M. P.)*

Metabolism in Tuberculosis.—Since tuberculous processes are different quantitatively and qualitatively we can hardly expect to find metabolic alterations specific for all types of the disease. But the correlation of certain changes with definite phases of the disease is promising. The intermediary protein metabolism has so far been studied only from the point of view of alterations occurring in the structure of the plasma proteins. Studies on chemically well-defined catabolic protein products are still incomplete. In bronchogenic reinfections (infraclavicular infiltrations), fibrinogen and globulin are absolutely and relatively increased, and albumin is decreased. This change is the more marked the more destructive processes predominate. In resorbing or encapsulating foci, this alteration is slight or absent. In terminal cases the total protein is decreased, due to a severe hypoalbuminaemia. In the presence of fatty changes in the liver, hyperinosis is slight or absent in spite of destructive pulmonary processes. A similar shifting of the plasma proteins is observed during the manifestations of the primary processes; but, barring very extensive lesions, the alterations are quantitatively smaller than during the period of reinfection. The estimation of the plasma proteins affords, then, assistance in the recognition of the various types of tuberculous lesions, despite the fact that they are in no way specific. Important is the marked parallelism between this "shifting to the left" of the protein fractions and the amount of tissue destruction. This shifting causes the increased sedimentation rate of erythrocytes and granular streaming of the red cells in the capillaries, which may have important bearings on the dynamics of the blood-circulation. Phagocytosis is most likely influenced by the electrostatic alterations caused by the protein shifting. Its bearing on coagulation and thrombus-formation has been discussed. Since the colloid-osmotic pressure is altered, the exchange between tissue and blood becomes affected, resulting in actual or potential hydrops, which can be demonstrated by Volhard's water test. Marked increase in fibrinogen and globulin may cause tubular alterations in the kidneys, and also albuminuria. Very pronounced increases may be the cause of amyloidosis. The nonprotein nitrogen is occasionally increased in far-advanced phthisis without impairment of renal function. This is probably due to the increased endogenous protein destruction. The nitrogen excretion is frequently greater than the intake, which is again due to destructive processes. Studies of the lipoid metabolism have not, as yet, been productive of significant data. The depletion of the fat storage must be viewed in the same light as the same processes in other cachexia-producing diseases. The blood-sugar is normal in the vast majority of phthisics. Deviations in both directions are reported without apparent parallelism with the clinical course. The usually reported unfavorable influence that diabetes exerts upon tuberculosis is not without exceptions. Neither are all phthisics hypersensitive to insulin. The sugar tolerance may be markedly disturbed; prolongation of the hyperglycaemic reaction and aggravation of the late hypoglycaemia have been observed. As far as the mineral metabolism is concerned, a specific demineralisation and disturbances in the alkali-acid balance have been of special interest. The reports on the chloride content of the blood are contradictory. The calcium values are usually within normal limits. The greater output than intake of calcium, magnesium, chloride and phosphorus is coincident with a negative nitrogen balance and is a manifestation of

actual loss of tissue. The actual acidity of the blood is normal, but a reduction of the alkali reserve is found in far advanced and terminal patients. The basal metabolic rate, although not infrequently increased or decreased, is certainly not dependent on the extent of the specific lesion, but probably on the degree of toxaemia. It is expected that all metabolic data will gain much more significance and regularity if they are properly related to distinct pathogenetic types instead of to the mere extent of the lesions. The degree of toxin sensitiveness, which is considered in the pathogenetic types as classified by W. Neumann, is the most significant factor in metabolic disturbances.—*Über Stoffwechselveränderungen im Verlaufe der menschlichen Phthise und ihre klinische Bedeutung, W. Starlinger, Klin. Wchnschr., May 27, 1928, vii, 1017.*—(*M. P.*)

Tissue Metabolism in Tuberculosis.—The tuberculin reaction of an infected organism may be caused either by an antigen-antibody reaction or by an allergic condition of cells; in the latter case either of all the cells or only of certain groups of cells. The correctness of either one of these hypotheses was investigated by Warburg's method for the estimation of glycolysis and oxygen consumption of tissue sections of known weight. About 40 healthy and 40 tuberculous guinea pigs were examined. Kidney, liver and spleen were investigated. In this way organs with and without specific alterations were tested. The metabolism of these organs was measured both with and without the addition of specific bacillary products. Since the tuberculin reaction is an inflammatory process, a positive response to the addition to specific products would be indicated by an increased oxygen consumption. The following results were obtained: The respiration of tissue-sections from tuberculous guinea pigs without specific cellular alterations is not increased, as compared with the respiration of normal tissue. The respiration of tissue containing tuberculous foci is approximately 50 per cent higher than that of normal tissue. Measurements of respiration and of aerobic glycolysis do not demonstrate a quantitatively or qualitatively changed reaction of tuberculous tissue towards tuberculin or bacillary extracts, as compared with noninfected tissues. It was not possible to demonstrate a specific reaction of focal tissue against tuberculin by respiratory measurements. Since isolated tissues did not show any evidence of an allergic response, and since the intact and infected organism undoubtedly does react with inflammatory processes, it was concluded that the allergic reactivity must be dependent on factors not present in the tissues examined, that is, on functions of the nervous system, blood, or vascular system. Glycolysis was increased in the spleens of infected animals. This emphasizes the important rôle of the lymph-adenoid tissue in tuberculosis.—*Über Gewebstoffwechseluntersuchungen am Tuberkulose infizierten Organismus, W. Keller, Klin. Wchnschr., December 24, 1927, vi, 2460.*—(*M. P.*)

Key to Abstractors

A. P.: Andrew Peters, Pittsfield, Mass.
B. H. D.: Bruce H. Douglas, Northville, Mich.
B. T. McM.: B. T. McMahon, Loomis, N. Y.
F. G. P.: Frank G. Petrik, Loomis, N. Y.
G. L. L.: G. L. Leslie, Detroit, Mich.
H. J. C.: H. J. Corper, Denver, Col.
H. McL. R.: H. McL. Riggins, Loomis, N. Y.
J. S. W.: J. Stanley Woolley, Loomis, N. Y.
M. P.: Max Pinner, Northville, Mich.
P. J. W.: Park J. White, St. Louis, Mo.
U. E. Z.: U. E. Zambarano, Providence, R. I.
W. I. W.: Walter I. Werner, Northville, Mich.

INDEX OF ABSTRACTS OF TUBERCULOSIS

Abdominal tuberculosis in children with pneumoperitoneum, diagnosis of, X-ray, 125
Abscess, pulmonary, Chronic, 62
Absorption of hydropneumothorax exudates, 140
Accidents, Nervous, in pleuropulmonary operations, 5
Achelis, H. Treatment of surgical tuberculosis with krysolgan and triphal, 31
Actinomycosis of lungs, 65
Actinotherapy in tuberculosis, 25
Activator of pulmonary tuberculosis, Cachexia as, 114
Acute respiratory infections, Atmospheric conditions and, 111
Addison's disease and diabetes, 72
Adenitis, cervical, tuberculous, in infancy, X-ray diagnosis of, 116
Adenoma of liver, Tubercle in, 140
Administration, antituberculosis, in England, Flaws in, 102
Adults, Protective inoculation of, with "BCG," 105
Agassiz, C. D. S. Nontuberculous pulmonary fibrosis in children, 121
Alessio, F., and Penada, M. Treatment of pulmonary tuberculosis with sanocrysin, 32
Alexander, H. Surgical treatment of pulmonary tuberculosis, 2
Alleged congenital tuberculosis, Case of, 115
Allergic stage, Ranke's second, 136
Allergy and bronchial asthma, 57
—— —— reticulo-endothelial system, 134
Ameuille, P. Thoracoplasty with artificial pneumothorax on opposite side, 23
Ameuille and Tacquet. Diagnosis of pleuropulmonary tumor in child, 78
Amino-acids in tuberculosis, 142, 143
Amputation of arm and pulmonary tuberculosis, 114
Amrein, O. Clinical forms of Ranke's secondary stage, 136
Amyloid, Origin and disappearance of, 139
Anatomical development of pulmonary tuberculosis, 135
Anderson, W. T., and Hess, A. F. Antirachitic activity of ultraviolet rays, 29
Aneurysm, Compression of pulmonary artery by, 51
Animals, domestic, Tuberculosis among, in Germany, 128
Annular shadows, 138
—— ——, Formation of, 138
Antimony, colloidal, Treatment of tuberculosis with, 34
——, tartrate of, Treatment of haemoptysis with, 34
Antirachitic activity of ultraviolet rays, 29
Antiseptics, Pulmonary, 49
Antituberculosis administration in England, Flaws in, 102
—— campaign in Belgian coal-mines, 98
—— —— —— Meurthe-et-Moselle, France, 92
—— ——, Lessons of, 91
—— dispensary, Rural, in Belgium, 98
—— insurance in Italy, 101
—— League, Belgian, in 1925, 94
—— ——, ——, Work of, 95
—— resources, Massachusetts, 101
Apices, pulmonary, Tuberclosis of, 136
Apparatus, artificial-pneumothorax, Portable, 11
—— for artificial pneumothorax, Pocket, 10
Arabs, Pulmonary tuberculosis among, 87
Arm, Amputation of, and pulmonary tuberculosis, 114
Armand-Delille and Lestocquoy. Tuberculous lobitis in children, 122
—— —— Rovèche. Artificial pneumothorax in children, 7
Arnett, J. H. Addison's disease and diabetes, 72
Arnstein, A. Cachexia as activator of pulmonary tuberculosis, 114
Artery, pulmonary, Compression of, by aneurysm, 51

Artificial pneumothorax, 7
—— —— apparatus, Portable, 11
—— ——, Bilateral, 15, 16
—— ——, ——, Contralateral pressure in, 16
—— ——, Blood sugar in, 19
—— ——, Displacement of trachea and oesophagus following, 17
—— ——, Ergomanometer in, 11
—— ——, Healing in, 9
—— ——, —— of cavities by, 9
—— ——, Holzknecht-Jakobsohn phenomenon in, Significance of, 16
—— —— in children, 7
—— ——, Incomplete, 14
—— ——, Indications for, 9
—— ——, Intrapleural pressures in, 16
—— ——, Manometric measurements in, 12
—— ——, Mechanism and indications for, 10
—— ——, Mediastinal hernia in, 16
—— ——, Mediastinum in spontaneous and, 16
—— ——, New technique in, 12
—— ——, Paradoxes of, 7
—— ——, pleural exudates of, Tubercle bacilli in, 18
—— ——, Pleuritic exudates complicating, 17
—— ——, Pocket apparatus for, 10
—— ——, Results of, 8
—— ——, Selective collapse in, 14
—— ——, Spontaneous pneumothorax following unsuccessful attempts at, 18
—— ——, Technique and results of, 14
—— ——, ——, symptomatology and management of, 13
—— ——, Thoracoplasty versus, 23
—— ——, —— with, on opposite side, 23
—— ——, Treatment of pulmonary tuberculosis with, 6
—— ——, Value of, 8
Aspergillina, Pseudotuberculosis, 66
Aspergillosis, Humoral and skin reactions in, 66
——, Pulmonary, 66
——, ——, atypical tuberculosis with, Case of, 66
Asserson, M. A. Tuberculosis in infants, 115
Assmann, H. Assmann's infraclavicular infiltrations, 136
Assmann's infraclavicular infiltrations, 136
Asthma, 54
—— and hay fever, Ephedrine in, 59
—— —— —— ——, House-dust in, 56
—— —— nasal conditions, 57
—— —— tuberculosis 54
——, Bronchial, 54, 55
——, ——, Allergy and, 57
——, ——, Etiology of, 55
——, ——, Nose and throat in, 56
——, Bronchoscopy in, 57
——, diagnosis of, X-ray, 57
——, Skin tests in, 58
——, Treatment of, 58, 59
Astorre, A., and Fiorentini, A. Treatment of pulmonary tuberculosis with calcium, 35
Atelectasis, Massive, of lung complicating fresh primary complex, 121
Atmospheric conditions and acute respiratory infections, 111
Atwood, A. W. Nontuberculous spontaneous pneumothorax in father and son, 52
Atypical tubercle bacilli, vaccines of, Treatment of tuberculosis with, 2
—— tuberculosis with pulmonary aspergillosis, Case of, 66
"Aurophos," Treatment of pulmonary tuberculosis with, 31
Austrian, C. R. Evolution of tuberculous infection in childhood, 118
Austrian Sanocrysin Committee, Conclusions of, 33
Autogenous vaccines, Treatment of pulmonary tuberculosis with, 1
Axillary lymph nodes, Tuberculosis of, with cancer of breast, 78
Ayerza's disease, 80
Azoulay, Bazgan, Bezançon and Etchegoin. Chronic spirochaetal pulmonary gangrene, 64

Bacilli, tubercle, atypical, vaccines of, Treatment of tuberculosis with, 2

Bacilli, tubercle, Bovine, in human sputum, 109
——, ——, dead, Protective inoculation of children with, 49
——, ——, ——, Ray-fungus tissue reaction to, 137
——, ——, in pleural exudates of artificial pneumothorax, 18
——, ——, living virulent, Treatment of pulmonary tuberculosis with, 2
Bactericidal action of light, 28
Bacteriology of pulmonary gangrene, 64
Baer, A. Healing of cavities by artificial pneumothorax, 9
Bang, O. Sanocrysin and experimental tuberculosis, 33
Bang's experiments with sanocrysin, Criticism of, 34
Barach, A. L. Pulmonary function in pneumonia, 51
Barenberg, L. H., and Lewis, J. M. Carbon-arc irradiation of infants, 126
Bazgan, Bezançon, Etchegoin and Azoulay. Chronic spirochaetal pulmonary gangrene, 64
"BCG," immunization with, General, discountenanced, 104
—— not harmless, 104
——, Pathological changes caused by, 105
——, Practical application of, 48
——, Protective inoculation of adults with, 105
——, —— —— —— cattle with, 105
——, —— —— with, 41, 47, 102, 103
——, —— —— ——, criticized, 105
——, —— —— ——, Subcutaneous, 103, 104
—— vaccine, Experimental studies on, 48
—— ——, Immunization with, 48
——, Virulence of, 104
Becker. Prognostic value of urochromogen and red-cell sedimentation reactions and leucocytes in tuberculosis, 41
Beekmann, A. Nature of symptoms following Sanocrysin, 33
Beitzke, H. Criticism of Ranke's classification, 136.
——, ——. Route of tuberculous infection, 108
Belgian Antituberculosis League in 1925, 94
—— —— ——, Work of, 95
—— children, Prevention of tuberculosis in, 97
—— coal-mines, Antituberculosis campaign in, 98
—— Congo, Sanitary situation in, 99
Belgium, Rural antituberculosis dispensary in, 98
Benda and Sergent. Pulmonary syphilis, 79
Bernard, Bezançon and Moreau. Spirochaetal pulmonary gangrene, 63
Bernou, A. Effects of oleothorax, 21
Bersch, E. Tubercle in adenoma of liver, 140
Betrand and Lemaire. Lymphogranulomatosis, 79
Bezançon, F., Jacquelin, A., and Etchégoin, E. Intrapleural injections of codliver oil, 37
Bezançon and Etchegoin. Bacteriology of pulmonary gangrene, 63
——, Etchegoin, Azoulay and Bazgan. Chronic spirochaetal pulmonary gangrene, 64
——, Imbert and Villaret. Treatment of pulmonary tuberculosis with sanocrysin, 32
——, Moreau and Bernard. Spirochaetal pulmonary gangrene, 63
Bier, F. Red-cell sedimentation in surgical tuberculosis in children, 126
Bigelow, G. H. Massachusetts antituberculosis resources, 101
Bilateral artificial pneumothorax, 15, 16
—— —— ——, Contralateral pressure in, 16
Binet, L. Physiological rôle of various pulmonary cells, 134
Biraud, Y. M. Causes of recent decline of tuberculosis mortality, 84
Bishop, H. D. Human and bovine tuberculosis in Guernsey, 128
Bladder, tumors of, Diagnosis between renal tuberculosis and, 78
——, ulcers of, Nonspecific, following tuberculosis, 53

Blanche, M. Pulmonary antiseptics, 49
Blatt, M. L., and Greengard, J. Pericarditis as primary clinical manifestation of tuberculosis in childhood, 125
Blood monocytes in tuberculous children, 120
—— sugar in artificial pneumothorax, 19
Blumenberg, W., and Selter, H. Experimental studies on BCG vaccine, 48
Bodmer, H. Hypertonic dextrose solutions in tuberculosis, 38
Boquet, A., Calmette, A., Guérin, C., and Nègre, L. Protective inoculation with BCG, 41, 47
Bordet, F., and Parodi, F. Contralateral pressure in bilateral artificial pneumothorax, 16
——, ——., —— Sergent, E. Pulmonary gangrene of buccopharyngeal origin, 63
Bovine tubercle bacilli in human sputum, 109
—— tuberculin tests, Human and, in children, 116
—— tuberculosis, Human and, in Guernsey, 128
Breast, cancer of, Tuberculosis of axillary lymph nodes with, 78
Breccia, G. Opotherapy in tuberculosis, 38
Brennemann, J. Nontuberculous child, 118
Brieger, E. Significance of Holzknecht-Jakobsohn phenomenon in artificial pneumothorax, 16
Brody, C. Treatment of tuberculous peritonitis, 126
Bronchi, carcinoma of, Histogenesis of, 77
Bronchial asthma, 54, 55
—— ——, Allergy and, 57
—— ——, Etiology of, 55
—— ——, Nose and throat in, 56
—— dilatation, Etiology of, 60
—— occlusion in nontuberculous pulmonary disease, 62
—— system, preterminal, Bronchiectasis of, 60
Bronchiectasis, 60
——, chronic, Treatment of, 61
——, Haemoptysis from, 60
——, Mediastinal pleurisy and, 61
—— of preterminal bronchial system, 60
Bronchopulmonary spirochaetosis, 65
Bronchoscopy in asthma, 57
Brown, C. L., and Grabfield, G. P. Atmospheric conditions and acute respiratory infections, 111
Brown G. T. Bronchial asthma, 54
Buccopharyngeal origin, Pulmonary gangrene of, 63
Bucher, R. Manometric measurements in artificial pneumothorax, 12
Budai, S. Constitutional effects of tuberculosis, 140
Bundesen, H. N., Lemon, H. B., Falk, I. S., and Coade, E. N. Transmissibility of ultraviolet radiations of sun, 28
Busson, B. Spirillosis following chronic tonsillitis, 65

Cachexia as activator of pulmonary tuberculosis, 114
Calcium, Treatment of pulmonary tuberculosis with, 35
Calmette, A. Protective inoculation of adults with "BCG," 105
——, ——. Protective inoculation with "BCG," 102, 103
——, ——., Guérin, C., Nègre, L., and Boquet, A. Protective inoculation with BCG, 41, 47
Calmette's statistics, Criticism of, 106, 107
—— vaccine, Reliability of, 104
Campaign, Antituberculosis, in Belgian coalmines, 98
——, ——, —— Meurthe-et-Moselle, France, 92
——, ——, Lessons of, 91
Camphor in treatment of pulmonary tuberculosis, 36
Cancer of breast, Tuberculosis of axillary lymph nodes with, 78
—— —— lung, 74, 75
—— —— ——, Primary, 75, 76
—— —— ——, X-ray aspects of, 78
Cantani, F., and von Ilberg, A. V. Treatment of pulmonary tuberculosis with autogenous vaccines, 1
Capacity, Vital, 142
Carbon-arc irradiation of infants, 126
Carcinoma of bronchi, Histogenesis of, 77
—— on basis of lupus vulgaris, 74

Carpi, U. Technique, symptomatology and management of artificial pneumothorax, 13
Cartilages, costal, ossification of, Pulmonary tuberculosis and, 137
Case of alleged congenital tuberculosis, 115
—— —— atypical tuberculosis with pulmonary aspergillosis, 66
Casellas, P. R. Infarct of lung, 51
Cases of diseases of respiratory organs, Interesting, 51
Casparis, H. Phlyctenular keratoconjunctivitis, 124
Cathala, Ourmansky, Chéne and Garnier. X-ray aspects of cancer of lung, 78
Cattle, Protective inoculation of, with "BCG," 105
Causes of recent decline of tuberculosis mortality, 84
Caussade, G., and Tardieu, A. Histology of pulmonary gangrene, 63
——, ——., —— ——, ——. Mitral stenosis and pulmonary tuberculosis, 71
——, ——., —— ——, ——. Recurrent pulmonary congestion, 51
Caussimon, J., and Leuret, E. Absorption of hydropneumothorax exudates, 140
Cautery, thoracoscopic, Modified, 23
Cavities, Healing of, by artificial pneumothorax, 9
——, —— ——, Roentgenography of, 138
—— in first years of life, 138
Cells, pulmonary, Physiological rôle of various, 134
Ceric earths, Treatment of pulmonary tuberculosis with sulphates of, 34
Cervical adenitis, tuberculous, in infancy, X-ray diagnosis of, 116
Chabaud, J. Nervous accidents in pleuropulmonary operations, 5
Changes, Pathological, caused by "BCG," 105
Chaumet and Zawadowski. Pulmonary tuberculosis and ossification of costal cartilages, 137
Chemical studies in tuberculosis, 142
Chemotherapy of tuberculosis, Rationale of, 30
Chéne, Garnier, Cathala and Ourmansky. X-ray aspects of cancer of lung, 78
Cheney, G. Ayerza's disease, 80
Cherechewski, Florentin and Lebouyries. Intracardiac injections in treatment of pulmonary disease, 30
Chest survey, Roentgenographic, of Hawaiian soldiers, 89
Chiari, H. Pathological changes caused by "BCG," 105
Child, Nontuberculous, 118
——, pleuropulmonary tumor in, Diagnosis of, 78
Childhood, joint tuberculosis in, Prognosis of, 126
——, Prevention of tuberculosis in, 49
——, tuberculosis in, hilum, Diagnosis of, 123
——, —— ——, primary clinical manifestation of, Pericarditis as, 125
——, —— of, Hilum, 122
—— ——, severe, Course of, 119
——, Tuberculous and nontuberculous pulmonary disease in, 118
——, —— infection in, Evolution of, 118
Children, Artificial pneumothorax in, 7
——, Belgian, Prevention of tuberculosis in, 97
——, Exposure of, to tuberculous teacher, 128
——, Nontuberculous pulmonary fibrosis in, 121
——, Protective inoculation of, with dead tubercle bacilli, 49
——, school, young, Tuberculosis in, 117
——, surgical tuberculosis in, Red-cell sedimentation in, 126
——, tebeprotin injections in, Leucocytes after, 124
——, treatment of, Ultraviolet rays, in, 127
——, tuberculin tests in, Human and bovine, 116
——, Tuberculosis of infants and, in Warsaw, 115
——, tuberculous, Blood monocytes in, 120
——, —— lobitis in, 122
—— with pneumoperitoneum, abdominal tuberculosis in, diagnosis of, X-ray, 125
Christison, J. T., and Warwick, M. Actinomycosis of lungs, 65
Chronic bronchiectasis, Treatment of, 61
—— mixed infection in pulmonary tuberculosis, Treatment of, with "Omnadin," 2

Chronic pulmonary abscess, 62
—— spirochaetal pulmonary gangrene, 64
—— tonsillitis, Spirillosis following, 65
Chylothorax due to mediastinal sarcoma, 79
Clark, J. A., Jr. Treatment of asthma, 59
Clarke, B. R. Treatment of pulmonary tuberculosis with sanocrysin, 33
Classification, Ranke's, of tuberculosis, Criticism of, 135, 136
Clauberg, K. W. Fatty liver in pulmonary tuberculosis, 72
Clerf, L. H. Bronchoscopy in asthma, 57
Clinical forms of Ranke's secondary stage, 136
Coade, E. N., Bundesen, H. N., Lemon, H. B., and Falk, I. S. Transmissibility of ultraviolet radiations of sun, 28
Coal-mines, Belgian, Antituberculosis campaign in, 98
Coal miners, Silicosis and tuberculosis in, 69
Codliver oil, Intrapleural injections of, 37
Coexisting syphilitic laryngitis and pulmonary tuberculosis, 79
Coke, F. Asthma, 54
Collapse, Selective, in artificial pneumothorax, 14
—— therapy, Indications for, 3
Colloidal antimony, Treatment of tuberculosis with, 34
Combined pulmonary tuberculosis and pulmonary syphilis, 79, 80
Complicating artificial pneumothorax, Pleuritic exudates, 17
—— fresh primary complex, Massive atelectasis of lung, 121
—— pulmonary tuberculosis, Haemolytic jaundice, 72
Complications in surgical treatment of pulmonary tuberculosis, 3
Compression of pulmonary artery by aneurysm, 51
Conception of tuberculosis, Present, 81
Conclusions of Austrian Sanocrysin Committee, 33
Congenital tuberculosis, Case of alleged, 115
Congestion, pulmonary, Recurrent, 51
Congo, Belgian, Sanitary situation in, 99
Constitutional effects of tuberculosis, 140
—— factor in tuberculosis, 110
Contact, Transient, and tuberculosis, 109
Contralateral pressure in bilateral artificial pneumothorax, 16
Costal cartilages, ossification of, Pulmonary tuberculosis and, 137
Couland and Rist. Bilateral artificial pneumothorax, 15
Course of severe childhood tuberculosis, 119
Coxitis, Nontuberculous, 72
Criticism of Bang's experiments with sanocrysin, 34
—— —— Calmette's statistics, 106, 107
—— —— Ranke's classification of tuberculosis, 135, 136
Cumming, W. M. Haemolytic streptococci in pulmonary tuberculosis, 52
Cured pulmonary gangrene, 63
Curschmann, W. Annular shadows, 138

Daub, H. P. Formation of annular shadows, 138
Dead tubercle bacilli, Protective inoculation of children with, 49
—— —— ——, Ray-fungus tissue reaction to, 137
DeBonis, V. Mechanism and indications for artificial pneumothorax, 10
Decline of tuberculosis mortality, 87
—— —— —— ——, Causes of recent, 84
Deist, H. Complications in surgical treatment of pulmonary tuberculosis, 3
Dermatitis due to triphal, 31
De Sanctis, A. G., and Reisman, H. A. Human and bovine tuberculin tests in children, 116
Development, Anatomical, of pulmonary tuberculosis, 135
Deviations, Mediastinal, in pulmonary tuberculosis, 131
Dextrose solutions, Hypertonic, in tuberculosis, 38
Diabetes, Addison's disease and, 72
—— and tuberculosis, 73
——, Juvenile, and tuberculosis, 73
——, pulmonary tuberculosis and insulin, 73

Diagnosis between renal tuberculosis and tumors of bladder, 78
—— of asthma, X-ray, 57
—— —— hilum tuberculosis in childhood, 123
—— —— intrathoracic tumors, 75
—— —— pleuropulmonary tumor in child, 78
—— —— syphilis, Serological, in tuberculosis, 80
——, Serological, of syphilis in tuberculosis, 80
——, X-ray, of abdominal tuberculosis in children with pneumoperitoneum, 125
——, ——, —— asthma, 57
——, ——, —— tuberculous cervical adenitis in infancy, 116
Diaphragmatic hernia simulating pneumothorax, 52
Dietel, F. Carcinoma on basis of lupus vulgaris, 74
Dilatation, bronchial, Etiology, 60
Dilaudid, Treatment of pulmonary tuberculosis with, 38
Disappearance of amyloid, Origin and, 139
Disease, Addison's, and diabetes, 72
——, Ayerza's, 80
——, Perthes', 53
——, pulmonary, nontuberculous, Bronchial occlusion in, 62
Diseases of respiratory organs, Interesting cases of, 51
Disinfection in tuberculosis, 49
—— of tuberculous excreta, 50
Dispensary, Rural antituberculosis, in Belgium, 98
Displacement of trachea and oesophagus following artificial pneumothorax, 17
Domestic animals, Tuberculosis among, in Germany, 128
Dosage of sun's rays in heliotherapy. Measurement and, 26
Dumarest, F. Indications for collapse therapy, 3
Dunham, E. C., and Smythe, A. M. X-ray diagnosis of tuberculous cervical adenitis in infancy, 116
Dünner, L., and Mecklenburg, M. Mechanism of phrenic exairesis, 25
Dust, House-, in asthma and hay fever, 56
Dyspepsia in pulmonary tuberculosis, Treatment of, 72

Ear, middle-, tuberculosis, Primary, in infancy, 125
Early infancy, Tuberculin skin test in, 116
—— phthisis, Rain-bearing winds and, 111
Eber, E. Mediastinal hernia in artificial pneumothorax, 16
Eckstein, A. Cavities in first years of life, 138
Edwards, A. T. Surgery of intrathoracic tumors, 74
Effects, Constitutional, of tuberculosis, 140
Effects of oleothorax, 21
Eichelberger, L., and McCluskey, K. L. Chemical studies in tuberculosis, 142
Eickenbusch, F. Tuberculosis and pneumonokoniosis, 66
Eidinow, A. Bactericidal action of light, 28
Eisman, J. Etiology of bronchial asthma, 55
Engelsher, D. L. Coexisting syphilitic laryngitis and pulmonary tuberculosis, 79
England, antituberculosis administration in, Flaws in, 102
Ephedrine in asthma and hay fever, 59
——, Treatment of hay fever with, 59
Epidemiology, Experimental, of tuberculosis, 90
—— of tuberculosis, 90
Ergomanometer in artificial pneumothorax, 11
Escudier, F., and Mattei, C. Treatment of haemoptysis with tartrate of antimony, 34
Esser, A. Case of atypical tuberculosis with pulmonary aspergillosis, 66
Etchegoin, E., Bezançon, F., and Jacquelin, A. Intrapleural injections of codliver oil, 37
Etchegoin and Bezançon. Bacteriology of pulmonary gangrene, 63
——, Azoulay, Bazgan and Bezançon. Chronic spirochaetal pulmonary gangrene, 64
Etiology of bronchial asthma, 55
—— —— —— dilatation, 60
Eugling, M. Disinfection in tuberculosis, 49

Evolution of tuberculous infection in childhood, 118
Exairesis, phrenic, Mechanism of, 25
Excreta, tuberculous, Disinfection of, 50
Expectorant in pulmonary tuberculosis, Ipecopan as, 34
Experimental epidemiology of tuberculosis, 90
—— silicosis and tuberculosis, 70
—— studies on BCG vaccine, 48
—— tuberculosis, Helpin in, 36
—— ——, Sanocrysin and, 33
—— X-ray treatment of tuberculosis, 30
Experiments with oleo-vaccine, 1
—— —— sanocrysin, Bang's, Criticism of, 34
Exposure of children to tuberculous teacher, 128
—— to silica without resulting silicosis, 70
Exudates, hydropneumothorax, Absorption of, 140
——, pleural, of artificial pneumothorax, Tubercle bacilli in, 18
——, ——, Proteases of, 141
——, Pleuritic, complicating artificial pneumothorax, 17

Falk, I. S., Coade, E. N., Bundesen, H. N., and Lemon, H. B. Transmissibility of ultraviolet radiations of sun, 28
Falloise, A. Work of Belgian Antituberculosis League, 95
Father and son, Nontuberculous spontaneous pneumothorax in, 52
Fatty liver in pulmonary tuberculosis, 72
Ferenczy, K., and Maltolcsy, T. Primary cancer of lung, 75
Fever, hay, Ephedrine in asthma and, 59
——, ——, House-dust in asthma and, 56
——, ——, Treatment of, with ephedrine, 59
Feyrter, F. Histogenesis of carcinoma of bronchi, 77
Fibrin bodies in pneumothorax space, 139
Fibrosis, Pulmonary, 139
——, ——, Nontuberculous, in children, 121
Filtration of ultraviolet rays, 29
Fiorentini, A., and Astorre, A. Treatment of pulmonary tuberculosis with calcium, 35
First years of life, Cavities in, 138
Fischer, A. Triphal in pulmonary tuberculosis, 31
Flaws in antituberculosis administration in England, 102
Fleischner, F. Healing in artificial pneumothorax, 9
——, ——. Selective collapse in artificial pneumothorax, 14
Florentin, Lebouyries and Cherechewski. Intracardiac injections in treatment of pulmonary disease, 30
Following artificial pneumothorax, Displacement of trachea and oesophagus, 17
—— chronic tonsillitis, Spirillosis, 65
—— sanocrysin, Nature of symptoms, 33
—— tuberculosis, Nonspecific ulcers of bladder, 53
—— unsuccessful attempts at artificial pneumothorax, Spontaneous pneumothorax, 18
Ford, F. A. Experimental X-ray treatment of tuberculosis, 30
Formation of annular shadows, 138
France, Meurthe-et-Moselle, Antituberculosis campaign in, 92
Franke, H. Pseudotuberculosis aspergillina, 66
Freiberg, A. H. Prognosis of joint tuberculosis in childhood, 126
Fresh primary complex, Massive atelectasis of lung complicating, 121
Freund, R., and Magat, I. Helpin in experimental tuberculosis, 36
Freymuth, W. Treatment of pulmonary tuberculosis with helpin, 36
Fried, B. M. Primary cancer of lung, 76
Frisch, A. V., and Winkelbauer, A. Gastric ulcer and pulmonary tuberculosis, 71
Function, Pulmonary, in pneumonia, 51
Functional test for reticulo-endothelial system, 134
Funk, E. H., Jackson, C., and McCrae, T. Cancer of lung, 74
Fürth, E. Chylothorax due to mediastinal sarcoma, 79

Gaarde, F. W., and Maytum, C. K. Treatment of hay fever with ephedrine, 59
Galdi, F. Surgical treatment of pulmonary tuberculosis, 4

Gally, L., Soulas, A., and Rist, E. Haemoptysis from bronchiectasis, 60
Gangrene, Pulmonary, 62, 63
——, ——, Bacteriology of, 63
——, ——, Cured, 63
——, ——, Histology of, 63
——, ——, of buccopharyngeal origin, 63
——, ——, Spirochaetal, 63
——, ——, ——, Chronic, 64
Garcin and Loeper. Cancer of lung, 75
—— —— ——. Cured pulmonary gangrene, 63
—— —— ——. Primary cancer of lung, 76
Garnier, Cathala, Ourmansky and Chéne. X-ray aspects of cancer of lung, 78
Gastric disturbances and pulmonary tuberculosis, 71
—— ulcer and pulmonary tuberculosis, 71
Geeraerd. Pleuritic exudates complicating artificial pneumothorax, 17
General immunization with "BCG" discountenanced, 104
Germany, Tuberculosis among domestic animals in, 128
Ghon, A., Kreider, P., and Kudlich, H. Origin of reinfection in pulmonary tuberculosis, 114
Gierthmühlen, F. Exposure of children to tuberculous teacher, 128
Glomerulonephritis, Pulmonary tuberculosis and, 72
Goitre and pulmonary tuberculosis, 50
Gold miners, South African, Silicosis among, 67
——, Treatment of pulmonary tuberculosis with, 31
Gomenol, Oleothorax with, 22
Gordon, W. Rain-bearing winds and early phthisis, 111
Götzl, A. Criticism of Calmette's statistics, 106, 107
Grabfield, G. P., and Brown, C. L. Atmospheric conditions and acute respiratory infections, 111
Granite workers, Silicosis and tuberculosis in, 68
Grau. Anatomical development of pulmonary tuberculosis, 135
Gravesen, J. Results of thoracoplasty, 24
Greengard, J., and Blatt, M. L. Pericarditis as primary clinical manifestation of tuberculosis in childhood, 125
Griffith, A. S. Bovine tubercle bacilli in human sputum, 109
Gross, E. Pregnancy and pulmonary tuberculosis, 112
Guérin, A. Protective inoculation of cattle with "BCG," 105
Guérin, C., Nègre, L., Boquet, A., and Calmette, A. Protective inoculation with BCG, 41, 47
Guernsey, Human and bovine tuberculosis in, 128
Guinard, U. Prognostic value of repeated sputum examinations, 40
Guth, E. Rationale of chemotherapy of tuberculosis, 30
——, ——. Treatment of pulmonary tuberculosis with gold, 31
Gutmann, M. J. Tuberculosis morbidity among Jews, 90
Gwerder-Pedoja, J. Paradoxes of artificial pneumothorax, 7

Haemolytic jaundice complicating pulmonary tuberculosis, 72
—— streptococci in pulmonary tuberculosis, 52
Haemoptysis from bronchiectasis, 60
——, Treatment of, by irradiation of spleen, 29
——, —— ——, with tartrate of antimony, 34
Hague, O. J., and McBain, D. R. & R. W. Silicosis as industrial hazard, 67
Hantschmann, L., and Steube, M. Amino-acids in tuberculosis, 142, 143
Harris, L. H., and Stivelman, B. P. Diaphragmatic hernia simulating pneumothorax, 52
Haupt, H. Tuberculosis among domestic animals in Germany, 128
Hawaiian soldiers, Roentgenographic chest survey of, 89
Hawes, J. B., 2nd. Relation between upper respiratory tract and pulmonary tuberculosis, 113
——, ——. ——., ——. Suspecting tuberculosis, 83

Hawley, S. J., and Manges, W. F. X-ray diagnosis of asthma, 57
Hay fever, Ephedrine in asthma and, 59
—— ——, House-dust in asthma and, 56
—— ——, Treatment of, with ephedrine, 59
Hazard, industrial, Silicosis as, 67
Healing in artificial pneumothorax, 9
—— of cavities by artificial pneumothorax, 9
—— —— ——, Roentgenography of, 138
Heart, Pulmonary tuberculosis and, 70
Hedblom, C. A. Bronchiectasis, 60
Hefferman, P. Exposure to silica without resulting silicosis, 70
Heitz, E., and Wigand, R. Functional test for reticulo-endothelial system, 134
Heliotherapy in surgical tuberculosis, 26
——, Measurement and dosage of sun's rays in, 26
——, Sources of ultraviolet light for, 27
Helpin in experimental tuberculosis, 36
——, Treatment of pulmonary tuberculosis with, 36
Hernaman-Johnson, F. Ultraviolet rays, 27
Hernia, Diaphragmatic, Simulating pneumothorax, 52
——, Mediastinal, in artificial pneumothorax, 16
Hess, A. F., and Anderson, W. T. Antirachitic activity of ultraviolet rays, 29
Hilum of lung, 131
—— tuberculosis in childhood, Diagnosis of, 123
—— —— of childhood, 122
—— ——, Seasonal variations in, 133
Hirsch, G. Tuberculosis and myopia, 50
Hirschberg, F., and Rist, E. Displacement of trachea and oesophagus following artificial pneumothorax, 17
Histogenesis of carcinoma of bronchi, 77
Histology of pulmonary gangrene, 63
Historical note on treatment of pulmonary tuberculosis, 82
Holzknecht-Jakobsohn phenomenon in artificial pneumothorax, Significance of, 16
House-dust in asthma and hay fever, 56
Hudson, B. Incomplete artificial pneumothorax, 14
Huebschmann, P. Criticism of Ranke's classification of tuberculosis, 135
——, ——. Route of tuberculous infection, 109
Human and bovine tuberculin tests in children, 116
—— —— —— tuberculosis in Guernsey, 128
—— sputum, Bovine tubercle bacilli in, 109
Humoral and skin reactions in aspergillosis, 66
Hyde, T. L., and Holmes, G. W. X-ray aspects of primary tumors of lungs, 77
Hydropneumothorax exudates, Absorption of, 140
Hypertonic dextrose solutions in tuberculosis, 38

Ichok, G. Tumors and tuberculosis, 73
van Ilberg, A. V., and Cantani, F. Treatment of pulmonary tuberculosis with autogenous vaccines, 1
Imbert, Villaret and Bezançon. Treatment of pulmonary tuberculosis with sanocrysin, 32
Immunization with "BCG," General, discountenanced, 104
—— —— —— vaccine, 48
Incomplete artificial pneumothorax, 14
Indications for artificial pneumothorax, 9
—— —— —— ——, Mechanism and, 10
—— —— collapse therapy, 3
Industrial hazard, Silicosis as, 67
Infancy, early, Tuberculin skin test in, 116
——, tuberculosis in, Primary middle-ear, 125
——, tuberculous cervical adenitis in, X-ray diagnosis of, 116
Infant, Primary complex in liver of, 126
Infants and children, Tuberculosis of, in Warsaw, 115
——, Carbon-arc irradiation of, 126
——, Tuberculosis in, 115
Infarct of lung, 51
Infection, mixed, chronic, in pulmonary tuberculosis, Treatment of, with "Omnadin," 2
——, tuberculous, in childhood, Evolution of, 118
——, ——, Route of, 108, 109
——, respiratory, acute, Atmospheric conditions and, 111
Infraclavicular infiltrations, Assmann's, 136
Injections, Intracardiac, in treatment of pulmonary disease, 30

Injections of codliver oil, Intrapleural, 37
Inoculation, Protective, of adults with "BCG," 105
——, ——, —— cattle, with "BCG," 105
——, ——, —— children with dead tubercle bacilli, 49
——, ——, with BCG, 41, 47, 102, 103
——, ——, —— ——, criticized, 105
——, ——, —— ——, Subcutaneous, 103, 104
Insulin, Diabetes, pulmonary tuberculosis and, 73
——, Treatment of pulmonary tuberculosis with, 38
Insurance, Antituberculosis, in Italy, 101
Interesting cases of diseases of respiratory organs, 51
Intracardiac injections in treatment of pulmonary disease, 30
Intrapleural injections of codliver oil, 37
—— pressures in artificial pneumothorax, 16
Intrathoracic tumors, 74
—— ——, Diagnosis of, 75
—— ——, Surgery of, 74
Iodine, Treatment of pulmonary tuberculosis with, 35
Ipecopan as expectorant in pulmonary tuberculosis, 34
Irradiation, Carbon-arc, of infants, 126
—— of spleen, Treatment of haemoptysis by, 29
Italy, Antituberculosis insurance in, 101

Jackson, C., McCrae, T., and Funk, E. H. Cancer of lung, 74
Jacob, P., Trocme, P., and Rist, E. Mediastinal pleurisy and bronchiectasis, 61
Jacquelin, A., Etchégoin, E., and Bezançon, F. Intrapleural injections of codliver oil, 37
Jannasch, H. Therapeutic effects of sanocrysin and partigens compared, 33
Jannsen, T. Pulmonary tuberculosis and heart, 70
Jaundice, Haemolytic, complicating pulmonary tuberculosis, 72
Jessen, H. Treatment of pulmonary tuberculosis with sanocrysin, 33
Jews, Tuberculosis morbidity among, 90
Joint tuberculosis, Prognosis of, in childhood, 126
Joress, M. H. Treatment of pulmonary tuberculosis with artificial pneumothorax, 6
Juvenile diabetes and tuberculosis, 73

Kahn, M. H. Bronchial asthma, 55
Kathe and Steinmeyer. Bronchiectasis, 60
Keller, W. Tissue metabolism in tuberculosis, 144
Keratoconjunctivitis, Phlyctenular, 124
Kettle, E. H. Experimental silicosis and tuberculosis, 70
Kindberg and Kourilsky. Etiology of bronchial dilatation, 60
Kirsch-Hoffer, E. Chronic pulmonary abcess, 62
Kitcat, C. D., and Sellors, T. H. Pulmonary fibrosis, 139
Klein, F. Measles and tuberculosis, 113
Klingenstein, R. Serological diagnosis of syphilis in tuberculosis, 80
Knapp, P. Nonspecific ulcers of bladder following tuberculosis, 53
Knipping, H. W. Measurement and dosage of sun's rays in heliotherapy, 26
Knopf, S. A. Prevention of tuberculosis in childhood, 49
——, ——. ——. Tuberculosis among young women, 87
Knüppel, H. Ipecopan as expectorant in pulmonary tuberculosis, 34
Koeffer, O. Tuberculosis in young school children, 117
Koolman, M. D., and Kretschmer, M. X-ray treatment of pulmonary tuberculosis, 30
Koopman, H. Treatment of pulmonary tuberculosis with living virulent tubercle bacilli, 2
Kopec, T. Tuberculosis of infants and children in Warsaw, 115
Kormitzer, E., and Maendl, H. Modified thoracoscopic cautery, 23
Kornblum, K. Primary cancer of lung, 76
Korteweg, R. Epidemiology of tuberculosis, 90

Kourilsky and Kindberg. Etiology of bronchial dilatation, 60
v. Kovats, F. Portable artificial-pneumothorax apparatus, 11
Kraus, R. General immunization with "BCG" discountenanced, 104
——, ——. Reliability of Calmette's vaccine, 104
Krause, K. Ranke's second allergic stage, 136
Kreider, P., Kudlich, H., and Ghon, A. Origin of reinfection in pulmonary tuberculosis, 114
Kretschmer, M., and Koolman, M. D. X-ray treatment of pulmonary tuberculosis, 30
Krysolgan and triphal, Treatment of surgical tuberculosis with, 31
——, Mode of action of, 31
Kudlich, H., Ghon, A., and Kreider, P. Origin of reinfection in pulmonary tuberculosis, 114
Küss, G. Oleothorax with gomenol, 22
——, ——. Technique of oleothorax, 19

Lactation, prohibition of, Tuberculosis and, 83
Langelez, A. Prevention of tuberculosis in Belgian children, 97
Laryngitis, syphilitic, and pulmonary tuberculosis, Coexisting, 79
League, Belgian Antituberculosis, in 1925, 94
——, —— ——, Work of, 95
Lebouyries, Cherechewski and Florentin. Intracardiac injections in treatment of pulmonary disease, 30
Lefevre. Rural antituberculosis campaign in Belgium, 98
Lemaire and Betrand. Lymphogranulomatosis, 79
Lemon, H. B., Falk, I. S., Coade, E. N., and Bundesen, H. N. Transmissibility of ultraviolet radiations of sun, 28
Lenoir and Scherrer. Juvenile diabetes and tuberculosis, 73
Leotta, N. Operations in surgical treatment of pulmonary tuberculosis, 4
Lepskaja, R. I., and D. Rochlin, L. M. Treatment of pulmonary tuberculosis with insulin, 38
Lessons of antituberculosis campaign, 91
Lestocquoy and Armand-Delille. Tuberculous lobitis in children, 122
Letulle, M. Pathology of tuberculosis, 129
Leucocytes after tebeprotin injections in children, 124
—— in tuberculosis, Prognostic value of urochromogen and red-cell sedimentation reactions and, 41
Leuret, E., and Caussimon, J. Absorption of hydropneumothorax exudates, 140
Lewis, J. M., and Barenberg, L. H. Carbon-arc irradiation of infants, 126
Liebermeister, G. Interesting cases of diseases of respiratory organs, 51
Light, Bactericidal action of, 28
——, ultraviolet, Sources of, for heliotherapy, 27
——, ——, Treatment of ocular disease with, 29
Lipasotherapy in pulmonary tuberculosis, 37
Lipatren, Treatment of pulmonary tuberculosis with, 36
——, —— —— tuberculosis with, 36
Liver, adenoma of, Tubercle in, 140
——, Fatty, in pulmonary tuberculosis, 72
—— of infant, Primary complex in, 126
Living virulent tubercle bacilli, Treatment of pulmonary tuberculosis with, 2
Lobitis, tuberculous, in children, 122
Loeper and Garcin. Cancer of lung, 75
—— —— ——. Cured pulmonary gangrene, 63
—— —— ——. Primary cancer of lung, 76
Loeschke, H. Bronchiectasis of preterminal bronchial system, 60
Lord, F. T. Bronchial occlusion in nontuberculous pulmonary disease, 62
Lucherini, T. Blood sugar in artificial pneumothorax, 19
Lung, Cancer of, 74, 75
——, —— ——, Primary, 75, 76
——, —— ——, X-ray aspects of, 78
——, Hilum of, 131
——, Infarct of, 51
——, Massive atelectasis of, complicating fresh primary complex, 121
Lungs, Actinomycosis of, 65
——, tumors of, primary, X-ray aspects of, 77

Lupus vulgaris, Carcinoma on basis of, 74
Lymph-node tuberculosis, Multiple, and polyserositis, 123
Lymph nodes, axillary, Tuberculosis of, with cancer of breast, 78
Lymphocytosis and pulmonary tuberculosis, 41
Lymphogranulomatosis, 79
Lynham, J. E. A. Intrathoracic tumors, 74

Macaigne and Nicaud. Humoral and skin reactions in aspergillosis, 66
—— —— ——. Pulmonary aspergillosis, 66
MacNalty, A. S. Research in tuberculosis, 84
Maendl, H. Bilateral artificial pneumothorax, 16
——, ——. Intrapleural pressures in artificial pneumothorax, 16
——, ——., and Kormitzer, E. Modified thoracoscopic cautery, 23
Magat, I, and Freund, R. Helpin in experimental tuberculosis, 36
Mainini, C. Pocket apparatus for artificial pneumothorax, 10
Malooz. Lessons of antituberculosis campaign, 91
Maltolesy, T., and Ferenczy, K. Primary cancer of lung, 75
Management of artificial pneumothorax, Technique, symptomatology and, 13
Manges, W. F., and Hawley, S. J. X-ray diagnosis of asthma, 57
Manometric measurements in artificial pneumothorax, 12
Maragliano, V. X-rays in surgical treatment of pulmonary tuberculosis, 5
Martin, J. M. Flaws in antituberculosis administration in England, 102
Massachusetts antituberculosis resources, 101
Massive atelectasis of lung complicating fresh primary complex, 121
Mattei, C., and Escudier, F. Treatment of haemoptysis with tartrate of antimony, 34
Maurer, G. Treatment of pulmonary tuberculosis with lipatren, 36
Maxwell, C. L. Roentgenographic chest survey of Hawaiian soldiers, 89
Mayer, E. Actinotherapy in tuberculosis, 25
——, ——., and Meyer, K. Ray-fungus tissue reaction to dead tubercle bacilli, 137
Maytum, C. K., and Gaarde, F. W. Treatment of hay fever with ephedrine, 59
McBain, D. R. & R. W., and Hague, O. J. Silicosis as industrial hazard, 67
McCloy, C. H. Vital capacity, 142
McCluskey, K. L., and Eichelberger, L. Chemical studies in tuberculosis, 142
McCrae, T., Funk, E. H., and Jackson, C. Cancer of lung, 74
McFarland, W. Silicosis and tuberculosis in granite workers, 68
McGinnis, E. Asthma and nasal conditions, 57
McLaughlin, J. S. Skin tests of asthma, 58
Measles and tuberculosis, 113
Measurement and dosage of sun's rays in heliotherapy, 26
Measurements, Manometric, in artificial pneumothorax, 12
Mechanism and indications for artificial pneumothorax, 10
—— of phrenic exairesis, 25
Mecklenburg, M., and Dünner, L. Mechanism of phrenic exairesis, 25
Mediastinal deviations in pulmonary tuberculosis, 131
—— hernia in artificial pneumothorax, 16
—— pleurisy and bronchiectasis, 61
—— sarcoma, Chylothorax due to, 79
Mediastinum in spontaneous and artificial pneumothorax, 16
Meerson, D. Artificial pneumothorax, 7
Melamet. Combined pulmonary tuberculosis and pulmonary syphilis, 79
Mende, P. Fibrin bodies in pneumothorax space, 139
Metabolism in tuberculosis, 143
——, Tissue, in tuberculosis, 144
Metzger, M. Pregnancy and pulmonary tuberculosis, 111
Meunier, M. Multiple lymph-node tuberculosis and polyserositis, 123
Meurthe-et-Moselle, France, Antituberculosis campaign in, 92
Meyer, K., and Mayer, E. Ray-fungus tissue reaction to dead tubercle bacilli, 137

Meyer, M., and Zadek, I. Protective inoculation of children with dead tubercle bacilli, 49
Michel, M. Historical note on treatment of pulmonary tuberculosis, 82
Middle-ear tuberculosis, Primary, in infancy, 125
Miller, H., and Pines, G. Ephedrine in asthma and hay fever, 59
Milne, C. Treatment of pulmonary tuberculosis with sulphates of ceric earths, 34
Miners, coal, Silicosis and tuberculosis in, 69
——, gold, South African, Silicosis among, 67
Mines, coal-, Belgian, Antituberculosis campaign in, 98
Minor tuberculosis, So called, 82
Mitral stenosis and pulmonary tuberculosis, 71
Mixed infection, chronic, in pulmonary tuberculosis, Treatment of, with "Omnadin," 2
Mode of action of krysolgan, 31
Modified thoracoscopic cautery, 23
Moellgaard, H. Criticism of Bang's experiments with sanocrysin, 34
Möller, E. Treatment of chronic mixed infection in pulmonary tuberculosis with "Omnadin," 2
Monocytes, Blood, in tuberculous children, 120
Morbidity, Tuberculosis, among Jews, 90
Moreau, Bernard and Bezançon. Spirochaetal pulmonary gangrene, 63
Morelli, S. Bilateral artificial pneumothorax, 15
Mornard. Nontuberculous coxitis, 72
Morosowsky, N. Tuberculosis mortality in Ukraine, 90
Mortality, tuberculosis, Decline of, 87
——, ——, —— ——, Causes of recent, 84
——, ——, in Ukraine, 90
Moxey, P. Treatment of tuberculosis with colloidal antimony, 34
Multiple lymph-node tuberculosis and polyserositis, 123
Munro, W. T. Experiments with oleo-vaccine, 1
v. Muralt, F. L., and Weiller, P. Camphor in treatment of pulmonary tuberculosis, 36
Myopia, Tuberculosis and, 50

Nasal conditions, Asthma and, 57
Nature of symptoms following sanocrysin, 33
Neddermeyer, A. Treatment of haemoptysis by irradiation of spleen, 29
Nègre, L., Boquet, A., Calmette, A., and Guérin, C. Protective inoculation with BCG, 41, 47
Nervous accidents in pleuropulmonary operations, 5
Neuberger, J. Haemolytic jaundice complicating pulmonary tuberculosis, 72
Neumann, W. Gastric disturbances and pulmonary tuberculosis, 71
——, ——. Value of artificial pneumothorax, 8
New technique in artificial pneumothorax, 12
Nicaud and Macaigne. Humoral and skin reactions in aspergillosis, 66
—— —— ——. Pulmonary aspergillosis, 66
Nigoul-Foussal, M. Treatment of pulmonary tuberculosis with iodine, 35
Nobel, E. "BCG" not harmless, 104
——, ——. Virulence of "BCG," 104
Nogier. Filtration of ultraviolet rays, 29
Nonspecific ulcers of bladder following tuberculosis, 53
Nontuberculous child, 118
—— coxitis, 72
—— pulmonary disease, Bronchial occlusion in, 62
—— —— —— in childhood, Tuberculous and, 118
—— —— fibrosis in children, 121
—— spontaneous pneumothorax in father and son, 52
Nordmann, M. Primary complex in liver of infant, 126
Nose and throat in bronchial asthma, 56
Not harmless, "BCG," 104
Nyren, T., and Tillgren, J. Pulmonary tuberculosis and glomerulonephritis, 72

Occlusion, Bronchial, in nontuberculous pulmonary disease, 62
Ocular disease, Treatment of, with ultraviolet light, 29
Oekonomopoulo, N. Mediastinum in spontaneous and artificial pneumothorax, 16
Oesophagus, Displacement of trachea and, following artificial pneumothorax, 17
Oil, codliver, Intrapleural injections of, 37
Oláh, D. Dermatitis due to triphal, 31
Olbrechts, E. Mediastinal deviations in pulmonary tuberculosis, 131
Oldenburg, F. Treatment of pulmonary tuberculosis with "aurophos," 31
Oleothorax, Effects of, 21
——, Technique of, 19
—— with gomenol, 22
Oleo-vaccine, Experiments with, 1
"Omnadin," Treatment of chronic mixed infection in pulmonary tuberculosis with, 2
Operations in surgical treatment of pulmonary tuberculosis, 4
——, pleuropulmonary, Nervous accidents in, 5
——, Surgical, and pulmonary tuberculosis, 114
Opie, E. L. Pathology of tuberculosis, 119
Opotherapy in tuberculosis, 38
Organotherapy of tuberculosis, 39
Origin and disappearance of amyloid, 139
—— of reinfection in pulmonary tuberculosis, 114
Ossification of costal cartilages, Pulmonary tuberculosis and, 137
Ourmansky, Chéne, Garnier and Cathala. X-ray aspects of cancer of lung, 78

Pagel, W. Allergy and reticulo-endothelial system, 134
Paradoxes of artificial pneumothorax, 7
Parisot, J., and Spillmann, L. Antituberculosis campaign in Meurthe-et-Moselle, France, 92
Parodi, F. Ergomanometer in artificial pneumothorax, 11
——, ——., and Bordet, F. Contralateral pressure in bilateral artificial pneumothorax, 16
Partigens, Therapeutic effects of sanocrysin and, compared, 33
Parturition in tuberculous women, 53
Pathological changes caused by "BCG," 105
Pathology of pulmonary tuberculosis, 129
—— —— tuberculosis, 119
Paulin, J, Vaudremer, A., and Puthomme, E. Treatment of tuberculosis with vaccines of atypical tubercle bacilli, 2
Paulsen, E. Treatment of dyspepsia in pulmonary tuberculosis, 72
——, ——. Treatment of pulmonary tuberculosis with dilaudid, 38
Pellé, A. Bronchopulmonary spirochaetosis, 65
Penada, M., and Alessio, F. Treatment of pulmonary tuberculosis with sanocrysin, 32
Pericarditis as primary clinical manifestation of tuberculosis in childhood, 125
Peritonitis, tuberculous, Treatment of, 126
Perla, D. Experimental epidemiology of tuberculosis, 90
Perthes' disease, 53
Peterson, M. Sources of ultraviolet light for heliotherapy, 27
Petschacher, L. Indications for artificial pneumothorax, 9
Philip, R. Decline of tuberculosis mortality, 87
Phlyctenular keratoconjunctivitis, 124
Phrenic exairesis, Mechanism of, 25
Phthisis, early, Rain-bearing winds and, 111
Physiological rôle of various pulmonary cells, 134
Pickering, D. Artificial pneumothorax, 7
Pines, G., and Miller, H. Ephedrine in asthma and hay fever, 59
Pirondini, E. Diagnosis between renal tuberculosis and tumors of bladder, 78
Pirquet, C. Protective inoculation with "BCG" criticized, 105
Pirquet testing, 117
Pissavy, A. Prognosis of pulmonary tuberculosis, 39
Pleural exudates of artificial pneumothorax, Tubercle bacilli in, 18
—— ——, Proteases of, 141

Pleurisy, Mediastinal, and bronchiectasis, 61
Pleuritic exudates complicating artificial pneumothorax, 17
Pleuropulmonary operations, Nervous accidents in, 5
—— tumor in child, Diagnosis of, 78
Pneumonia, Pulmonary function in, 51
Pneumonokoniosis, Tuberculosis and, 66
Pneumoperitoneum, abdominal tuberculosis in children with, diagnosis of, X-ray, 125
Pneumothorax, Artificial, 7
——, ——, apparatus, Portable, 11
——, ——, Bilateral, 15, 16
——, ——, ——, Contralateral pressure in, 16
——, ——, Blood sugar in, 19
——, ——, Displacement of trachea and oesophagus following, 17
——, ——, Ergomanometer in, 11
——, ——, Healing in, 9
——, ——, —— of cavities by, 9
——, ——, Holzknecht-Jakobsohn phenomenon in, Significance of, 16
——, ——, in children, 7
——, ——, Incomplete, 14
——, ——, Indications for, 9
——, ——, Intrapleural pressures in, 16
——, ——, Manometric measurements in, 12
——, ——, Mechanism and indications for, 10
——, ——, Mediastinal hernia in, 16
——, ——, Mediastinum in spontaneous and, 16
——, ——, New technique in, 12
——, ——, Paradoxes of, 7
——, ——, pleural exudates of, Tubercle bacilli in, 18
——, ——, Pleuritic exudates complicating, 17
——, ——, Pocket apparatus for, 10
——, ——, Results of, 8
——, ——, Selective collapse in, 14
——, ——, Spontaneous pneumothorax following unsuccessful attempts at, 18
——, ——, Technique and results of, 14
——, ——, ——, symptomatology and management of, 13
——, ——, Thoracoplasty versus, 23
——, ——, —— with, on opposite side, 23
Pneumothorax, Artificial, Treatment of pulmonary tuberculosis with, 6
——, ——, Value of, 8
Pneumothorax, Diaphragmatic hernia simulating, 52
—— space, Fibrin bodies in, 139
——, Spontaneous, following unsuccessful attempts at artificial pneumothorax, 18
——, ——, Nontuberculous, in father and son, 52
Pocket apparatus for artificial pneumothorax, 10
Poindecker. Conclusions of Austrian Sanocrysin Committee, 33
——, H. Treatment of pulmonary tuberculosis with sanocrysin, 33
Polyserositis, Multiple lymph-node tuberculosis and, 123
Pop, L. New technique in artificial pneumothorax, 12
Portable artificial-pneumothorax apparatus, 11
Pottenger, F. M. Present conception of tuberculosis, 81
Practical application of BCG, 48
Pregnancy and pulmonary tuberculosis, 111, 112
Present conception of tuberculosis, 81
Pressure, Contralateral, in bilateral artificial pneumothorax, 16
Pressures, Intrapleural, in artificial pneumothorax, 16
Preterminal bronchial system, Bronchiectasis of, 60
Prevention of tuberculosis in Belgian children, 97
—— —— —— —— childhood, 49
Price, G. B. Diagnosis of intrathoracic tumors, 75
Primary cancer of lung, 75, 76
—— clinical manifestation of tuberculosis in childhood, Pericarditis as, 125
—— complex, fresh, Massive atelectasis of lung complicating, 121
—— —— in liver of infant, 126
—— middle-ear tuberculosis in infancy, 125
—— tumors of lungs, X-ray aspects of, 77
Prognosis of joint tuberculosis in childhood, 126
—— —— pulmonary tuberculosis, 39

Prognostic value of repeated sputum examinations, 40
—— —— —— urochromogen and red-cell sedimentation reactions and leucocytes in tuberculosis, 41
Prohibition of lactation, Tuberculosis and 83
Proteases of pleural exudates, 141
Protective inoculation of adults with "BCG," 105
—— —— —— cattle with "BCG," 105
—— —— —— children with dead tubercle bacilli, 49
—— —— with BCG, 41, 47, 102, 103
—— —— —— —— criticized, 105
—— —— —— ——, Subcutaneous, 103, 104
Prym, P. Tuberculosis of axillary lymph nodes with cancer of breast, 78
Pseudotuberculosis aspergillina, 66
Pulmonary abscess, Chronic, 62
—— antiseptics, 49
—— apices, Tuberculosis of, 136
—— artery, Compression of, by aneurysm, 51
—— aspergillosis, 66
—— ——, atypical tuberculosis with, Case of, 66
—— cells, Physiological rôle of various, 134
—— congestion, Recurrent, 51
—— disease, nontuberculous, Bronchial occlusion in, 62
—— ——, treatment of, Intracardiac injections in, 30
—— ——, Tuberculous and nontuberculous, in childhood, 118
—— fibrosis, 139
—— ——, Nontuberculous, in children, 121
—— function in pneumonia, 51
—— gangrene, 62, 63
—— ——, Bacteriology of, 63
—— ——, Cured, 63
—— ——, Histology of, 63
—— —— of buccopharyngeal origin, 63
—— ——, Spirochaetal, 63
—— ——, ——, Chronic, 64
—— syphilis, 79
—— ——, Combined pulmonary tuberculosis and, 79, 80
Pulmonary tuberculosis among Arabs, 87
—— ——, Amputation of arm and, 114
—— ——, Anatomical development of, 135
—— —— and glomerulonephritis, 72
—— —— —— heart, 70
—— —— —— insulin, Diabetes, 73
—— —— —— ossification of costal cartilages, 137
—— —— —— pulmonary syphilis, Combined, 79, 80
—— ——, Cachexia as activator of, 114
—— ——, chronic mixed infection in, Treatment of, with "Omnadin," 2
—— ——, Coexisting syphilitic laryngitis and, 79
—— ——, dyspepsia in, Treatment of, 72
—— ——, Fatty liver in, 72
—— ——, Gastric disturbances and, 71
—— ——, —— ulcer and, 71
—— ——, Goitre and, 50
—— ——, Haemolytic jaundice complicating, 72
—— ——, —— streptococci in, 52
—— ——, Ipecopan as expectorant in, 34
—— ——, Lipasotherapy in, 37
—— ——, Lymphocytosis and, 41
—— ——, Mediastinal deviations in, 131
—— ——, Mitral stenosis and, 71
—— ——, Pathology of, 129
—— ——, Pregnancy and, 111, 112
—— ——, Prognosis of, 39
—— ——, reinfection in, Origin of, 114
—— ——, Relation between upper respiratory tract and, 113
—— ——, Surgical operations and, 114
—— ——, treatment of, Camphor in, 36
—— ——, —— ——, Historical note on, 82
—— ——, —— ——, Surgical, 2, 3, 4
—— ——, —— ——, —— Complications in, 3
—— ——, —— ——, ——, Operations in, 4
—— ——, —— ——, ——, X-rays in, 5
—— ——, —— ——, with artificial pneumothorax, 6
—— ——, —— ——, —— "aurophos," 31
—— ——, —— ——, —— autogenous vaccines, 1
—— ——, —— ——, —— calcium, 35

Pulmonary tuberculosis, treatment of, with dilaudid, 38
—— ——, —— ——, —— gold, 31
—— ——, —— ——, —— helpin, 36
—— ——, —— ——, —— insulin, 38
—— ——, —— ——, —— iodine, 35
—— ——, —— ——, —— lipatren, 36
—— ——, —— ——, —— living virulent tubercle bacilli, 2
—— ——, —— ——, —— sanocrysin, 32, 33
—— ——, —— ——, —— sulphates of ceric earths, 34
—— ——, —— ——, —— thoracoplasty, 23
—— ——, —— ——, X-ray, 30
—— ——, Triphal in, 31
Puthomme, E., Paulin, J., and Vaudremer, A. Treatment of tuberculosis with vaccines of atypical tubercle bacilli, 2

Radiations, ultraviolet, of sun, Transmissibility of, 28
Rain-bearing winds and early phthisis, 111
Ranke's classification of tuberculosis, Criticism of, 135, 136
—— second allergic stage, 136
—— secondary stage, Clinical forms of, 136
Rasor. Case of alleged congenital tuberculosis, 115
Rationale of chemotherapy of tuberculosis, 30
Ray-fungus tissue reaction to dead tubercle bacilli, 137
Rays, sun's, Measurement and dosage of, in heliotherapy, 26
——, Ultraviolet, 27
——, ——, Antirachitic activity of, 29
——, ——, Filtration of, 29
——, ——, in treatment of children, 127
Reaction, tissue, Ray-fungus, to dead tubercie bacilli, 137
Reactions, Humoral and skin, in aspergillosis, 66
——, urochromogen and red-cell sedimentation, and leucocytes in tuberculosis, Prognostic value of, 41
Recent decline of tuberculosis mortality, Causes of, 84
Recurrent pulmonary congestion, 51
Red-cell sedimentation in surgical tuberculosis in children, 126
—— ——, urochromogen and, reactions, and leucocytes in tuberculosis, Prognostic value of, 41
Reichardt, F. Transient contact and tuberculosis, 109
Reicholt, M. Treatment of tuberculosis with lipatren, 36
Reinfection in pulmonary tuberculosis, Origin of, 114
Reisman, H. A., and DeSanctis, A. G. Human and bovine tuberculin tests in children, 116
Relation between upper respiratory tract and pulmonary tuberculosis, 113
Reliability of Calmette's vaccine, 104
Renal tuberculosis and tumors of bladder, Diagnosis between, 78
Repeated sputum examinations, Prognostic value of, 40
Research in tuberculosis, 83, 84
Resources, antituberculosis, Massachusetts, 101
Respiratory infections, acute, Atmospheric conditions and, 111
—— organs, diseases of, Interesting cases of, 51
—— tract, upper, and pulmonary tuberculosis, Relation between, 113
Results of artificial pneumothorax, 8
—— —— —— ——, Technique and, 14
—— —— thoracoplasty, 24
Reticulo-endothelial system, 133
—— ——, Allergy and, 134
—— ——, test for, Functional, 134
Reuss, A. Tuberculosis and prohibition of lactation, 83
Rhoads, C. P. Reticulo-endothelial system, 133
Rist and Couland. Bilateral artificial pneumothorax, 15
——, E., and Hirschberg, F. Displacement of trachea and oesophagus following artificial pneumothorax, 17
——, ——., Gally, L., and Soulas, A. Haemoptysis from bronchiectasis, 60
——, ——., Jacob, P., and Trocme, P. Mediastinal pleurisy and bronchiectasis, 61

Rochlin, L. M., and Lepskajd, R. I. Treatment of pulmonary tuberculosis with insulin, 38
Roentgenographic chest survey of Hawaiian soldiers, 89
Roentgenography of healing of cavities, 138
Rogers, P. M. Blood monocytes in tuberculous children, 120
Rollier, A. Heliotherapy in surgical tuberculosis, 26
Ronzoni, G. Results of artificial pneumothorax, 8
Rosenberg, M., and Wolf, J. Diabetes, pulmonary tuberculosis and insulin, 73
Rosenfeld, S. Criticism of Calmette's statistics, 106, 107
Route of tuberculous infection, 108, 109
Rovéche and Armand-Delille. Artificial pneumothorax in children, 7
Rowe, A. H. House-dust in asthma and hay fever, 56
Rueda, P. Tuberculin skin test in early infancy, 116
Rupprecht, P. X-ray diagnosis of abdominal tuberculosis in children with pneumoperitoneum, 125
Rural antituberculosis dispensary in Belgium, 98
Russi, G. Parturition in tuberculous women, 53
Ryckebusch, G. Pulmonary tuberculosis among Arabs, 87

Samson, I. W. Allergy and bronchial asthma, 57
Sanitary situation in Belgian Congo, 99
Sanocrysin, 32
—— and experimental tuberculosis, 33
—— —— partigens compared, Therapeutic effects of, 33
——, Bang's experiments with, Criticism of, 34
—— Committee, Austrian, Conclusions of, 33
——, Nature of symptoms following, 33
——, Treatment of pulmonary tuberculosis with, 32, 33
Sarcoma, mediastinal, Chylothorax due to, 79
Sarfl, M. Primary middle-ear tuberculosis in infancy, 125
Sauerbruch, F. Surgical treatment of pulmonary tuberculosis, 3
Scherrer and Lenoir. Juvenile diabetes and tuberculosis, 73
Schlesinger, H. Compression of pulmonary artery by aneurysm, 51
School children, young, Tuberculosis in, 117
Schoop, A. Thoracoplasty versus artificial pneumothorax, 23
Schroeder, G. Organotherapy of tuberculosis, 39
——, ——. Technique and results of artificial pneumothorax, 14
Schroetter, H. Practical application of BCG, 48
Schumowskyj, P. Leucocytes after tebeprotin injections in children, 124
Seasonal variations in hilum tuberculosis, 133
Secher, K. Sanocrysin, 32
Second allergic stage, Ranke's, 136
Sédillot, J. Combined pulmonary tuberculosis and pulmonary syphilis, 80
Sedimentation, Red-cell, in surgical tuberculosis in children, 126
——, ——, urochromogen and, reactions, and leucocytes in tuberculosis, Prognostic value of, 41
Selective collapse in artificial pneumothorax, 14
Sellors, T. H., and Kitcat, C. D. Pulmonary fibrosis, 139
Selter, H., and Blumenberg, W. Experimental studies on BCG vaccine, 48
Sergent and Benda. Pulmonary syphilis, 79
——, E., and Bordet, F. Pulmonary gangrene of buccopharyngeal origin, 63
——, ——., —— Turpin, R. Constitutional factor in tuberculosis, 110
Serological diagnosis of syphilis in tuberculosis, 80
Severe childhood tuberculosis, Course of, 119
Sézary. Treatment of tuberculosis of skin with Vaudremer's vaccines, 1
Shadows, Annular, 138
——, ——, Formation of, 138

Significance of Holzknecht-Jakobsohn phenomenon in artificial pneumothorax, 16
Silica, Exposure to, without resulting silicosis, 70
Silicosis among South African gold miners, 67
—— and tuberculosis in coal miners, 69
—— —— —— —— granite workers, 68
—— as industrial hazard, 67
——, Experimental, and tuberculosis, 70
——, Exposure to silica without resulting, 70
Simon, G. Tuberculosis of pulmonary apices, 136
Simulating pneumothorax, Diaphragmatic hernia, 52
Skin, Humoral and, reactions in aspergillosis, 66
—— test, Tuberculin, in early infancy, 116
—— tests in asthma, 58
——, tuberculosis of, Treatment of, with Vaudremer's vaccines, 1
Sloan, E. P. Goitre and pulmonary tuberculosis, 50
Smythe, A. M., and Dunham, E. C. X-ray diagnosis of tuberculous cervical adenitis in infancy, 116
So called minor tuberculosis, 82
Soldiers, Hawaiian, Roentgenographic chest survey of, 89
Son, father and, Nontuberculous spontaneous pneumothorax in, 52
Sosman, M. C., and Steidl, J. H. Diabetes and tuberculosis, 73
Soulas, A., Rist, E., and Gally, L. Haemoptysis from bronchiectasis, 60
Sources of ultraviolet light for heliotherapy, 27
South African gold miners, Silicosis among, 67
Spillmann, L., and Parisot, J. Antituberculosis campaign in Meurthe-et-Moselle, France, 92
Spirillosis following chronic tonsillitis, 65
Spiro, I. Treatment of ocular disease with ultraviolet light, 29
Spirochaetal pulmonary gangrene, 63
—— —— ——, Chronic, 64
Spirochaetosis, Bronchopulmonary, 65
Spitz, S. Amputation of arm and pulmonary tuberculosis, 114
Spleen, irradiation of, Treatment of haemoptysis by, 29
Spontaneous and artificial pneumothorax, Mediastinum in, 16
—— pneumothorax following unsuccessful attempts at artificial pneumothorax, 18
—— —— in father and son, Nontuberculous, 52
Sputum examinations, repeated, Prognostic value of, 40
——, human, Bovine tubercle bacilli in, 109
Starlinger, W. Metabolism in tuberculosis, 143
Stassen, M. Antituberculosis campaign in Belgian coal-mines, 98
Statistics, Calmette's, Criticism of, 106, 107
Steidl, J. H., and Sosman, M. C. Diabetes and tuberculosis, 73
Steinmeyer and Kathe. Bronchiectasis, 60
Stenosis, Mitral, and pulmonary tuberculosis, 871
Steube, M., and Hantschmann, L. Aminoacids in tuberculosis, 142, 143
Stewart, C. A. Pirquet testing, 117
Sticotti, S. Artificial pneumothorax, 7
Stivelman, B. P., and Harris, L. H. Diaphragmatic hernia simulating pneumothorax, 52
Stoloff, E. G. Massive atelectasis of lung complicating fresh primary complex, 121
Stout, P. S. Nose and throat in bronchial asthma, 56
Streptococci, Haemolytic, in pulmonary tuberculosis, 52
Stuhl, C. Mode of action of krysolgan, 31
Suarez, E. Experimental studies on BCG vaccine, 48
Subcutaneous protective inoculation with "BCG," 103, 104
Sugar, Blood, in artificial pneumothorax, 19
Sulphates of ceric earths, Treatment of pulmonary tuberculosis with, 34
Sun, ultraviolet radiations of, Transmissibility of, 28
Sun's rays, Measurement and dosage of, in heliotherapy, 26
Surgery of intrathoracic tumors, 74

Surgical operations and pulmonary tuberculosis, 114
—— treatment of pulmonary tuberculosis, 2, 3, 4
—— —— —— —— ——, Complications in, 3
—— —— —— —— ——, Operations in, 4
—— —— —— —— ——, X-rays in, 5
—— tuberculosis, Heliotherapy in, 26
—— —— in children, Red-cell sedimentation in, 126
—— ——, Treatment of, with Krysolgan and triphal, 31
Survey, chest, Roentgenographic, of Hawaiian soldiers, 89
Suspecting tuberculosis, 83
Sutherland, D. P. Flaws in antituberculosis administration in England, 102
Symptomatology and management of artificial pneumothorax, Technique, 13
Symptoms following sanocrysin, Nature of, 33
Syphilis, diagnosis of, Serological, in tuberculosis, 80
——, Pulmonary, 79
——, ——, Combined pulmonary tuberculosis and, 79, 80
Syphilitic laryngitis and pulmonary tuberculosis, Coexisting, 79

Tacquet and Ameuille. Diagnosis of pleuropulmonary tumor in child, 78
Tardieu, A., and Caussade, G. Histology of pulmonary gangrene, 63
——, ——., —— ——, ——. Mitral stenosis and pulmonary tuberculosis, 71
——, ——., —— ——, ——. Recurrent pulmonary congestion, 51
Taronna, A. Surgical operations and pulmonary tuberculosis, 114
Tartrate of antimony, Treatment of haemoptysis with, 34
Tattersall, N. Silicosis and tuberculosis in coal miners, 69
Teacher, tuberculous, Exposure of children to, 128
Tebeprotin injections in children, Leucocytes after, 124
Technique and results of artificial pneumothorax, 14
Technique in artificial pneumothorax, New, 12
—— of oleothorax, 19
——, symptomatology and management of artificial pneumothorax, 13
Terrasse, J., and Tobé, F. Bilateral artificial pneumothorax, 15
Test for reticulo-endothelial system, Functional, 134
——, skin, Tuberculin, in early infancy, 116
Testing, Pirquet, 117
Tests, Skin, in asthma, 58
——, tuberculin, Human and bovine, in children, 116
——, ——, in schools, 117
Therapeutic effects of sanocrysin and partigens compared, 33
Therapy, collapse, Indications for, 3
Thoracoplasty, Results of, 24
——, Treatment of pulmonary tuberculosis with, 23
—— versus artificial pneumothorax. 23
—— with artificial pneumothorax on opposite side, 23
Thoracoscopic cautery, Modified, 23
Throat in bronchial asthma, Nose and, 56
Tillgren, J., and Nyren, T. Pulmonary tuberculosis and glomerulonephritis, 72
Tissue metabolism in tuberculosis, 144
—— reaction, Ray-fungus, to dead tubercle bacilli, 137
Tobé, F., and Terrasse, J. Bilateral artificial pneumothorax, 15
Tommasi, V. Disinfection of tuberculous excreta, 50
Tonsillitis, chronic, Spirillosis following, 65
Trachea and esophagus, Displacement of, following artificial pneumothorax, 17
Transient contact and tuberculosis, 109
Transmissibility of ultraviolet radiations of sun, 28
Treatment of asthma, 58, 59
—— —— children, Ultraviolet rays in, 127
—— —— chronic bronchiectasis, 61
—— —— —— mixed infection in pulmonary tuberculosis with "Omnadin," 2
—— —— dyspepsia in pulmonary tuberculosis, 72
—— —— haemoptysis by irradiation of spleen, 29

Treatment of haemoptysis with tartrate of antimony, 34
—— —— hay fever with ephedrine, 59
—— —— ocular disease with ultraviolet light, 29
—— —— pulmonary disease, Intracardiac injections in, 30
—— —— —— tuberculosis, Camphor in, 36
—— —— —— ——, Historical note on, 82
—— —— —— ——, Surgical, 2, 3, 4
—— —— —— ——, ——, Complications in, 3
—— —— —— ——, ——, Operations in, 4
—— —— —— ——, ——, X-rays in, 5
—— —— —— —— with artificial pneumothorax, 6
—— —— —— —— —— "aurophos," 31
—— —— —— —— —— autogenous vaccines, 1
—— —— —— —— —— calcium, 35
—— —— —— —— —— dilaudid, 38
—— —— —— —— —— gold, 31
—— —— —— —— —— helpin, 36
—— —— —— —— —— insulin, 38
—— —— —— —— —— iodine, 35
—— —— —— —— —— lipatren, 36
—— —— —— —— —— living virulent tubercle bacilli, 2
—— —— —— —— —— sanocrysin, 32, 33
—— —— —— —— —— sulphates of ceric earths, 34
—— —— —— —— —— thoracoplasty, 23
—— —— —— ——, X-ray, 30
—— —— surgical tuberculosis with krysolgan and triphal, 31
—— —— tuberculosis of skin with Vaudremer's vaccines, 1
—— —— —— with colloidal antimony, 34
—— —— —— —— lipatren, 36
—— —— —— —— vaccines of atypical tubercle bacilli, 2
—— —— ——, X-ray, Experimental, 30
—— —— tuberculous peritonitis, 126
——, Surgical, of pulmonary tuberculosis, 2, 3, 4
——, X-ray, of pulmonary tuberculosis, 30
——, ——, —— tuberculosis, Experimental, 30
Triphal, Dermatitis due to, 31
—— in pulmonary tuberculosis, 31
——, Treatment of surgical tuberculosis with krysolgan and, 31
Trocme, P., Rist, E., and Jacob, P. Mediastinal pleurisy and bronchiectasis, 61
Trumbull, G. C. Lipasotherapy in pulmonary tuberculosis, 37
Tubercle bacilli, atypical, vaccines of, Treatment of tuberculosis with, 2
—— ——, Bovine, in human sputum, 109
—— ——, dead, Protective inoculation of children with, 49
—— ——, ——, Ray-fungus tissue reaction to, 137
—— —— in pleural exudates of artificial pneumothorax, 18
—— ——, living virulent, Treatment of pulmonary tuberculosis with, 2
Tubercle in adenoma of liver, 140
Tuberculin skin test in early infancy, 116
—— tests, Human and bovine, in children, 116
—— —— in schools, 117
Tuberculosis, abdominal, in children with pneumoperitoneum, diagnosis of, X-ray, 125
——, Actinotherapy in, 25
——, Amino-acids in, 142, 143
—— among domestic animals in Germany, 128
—— —— young women, 87
—— and myopia, 50
—— —— pneumonokoniosis, 66
—— —— prohibition of lactation, 83
——, Asthma and, 54
——, atypical, with pulmonary aspergillosis, Case of, 66
——, Chemical studies in, 142
——, chemotherapy of, Rationale of, 30
——, childhood, severe, Course of, 119
——, classification of, Ranke's, Criticism of, 135, 136
——, conception of, Present, 81
——, congenital, Case of alleged, 115
——, Constitutional effects of, 140
——, —— factor in, 110
——, Diabetes and, 73
——, Disinfection in, 49

Tuberculosis, Epidemiology of, 90
——, —— ——, Experimental, 90
——, experimental, Helpin in, 36
——, ——, Sanocrysin and, 33
——, —— Silicosis and, 70
——, hilum, in childhood, Diagnosis of, 123
——, ——, of childhood, 122
——, ——, Seasonal variations in, 133
——, Human and bovine, in Guernsey, 128
——, Hypertonic dextrose solutions in, 38
—— in childhood, primary clinical manifestation of, Pericarditis as, 125
—— —— infants, 115
—— —— young school children, 117
——, joint, Prognosis of, in childhood, 126
——, Juvenile diabetes and, 73
——, lymph-node, Multiple, and polyserositis, 123
——, Measles and, 113
——, Metabolism in, 143
——, middle-ear, Primary, in infancy, 125
——, minor, So called, 82
—— morbidity among Jews, 90
—— mortality, Decline of, 87
—— ——, —— ——, Causes of recent, 84
—— —— in Ukraine, 90
——, Nonspecific ulcers of bladder following, 53
—— of axillary lymph nodes with cancer of breast, 78
—— —— infants and children in Warsaw, 115
—— —— pulmonary apices, 136
—— —— skin, Treatment of, with Vaudremer's vaccines, 1
——, Opotherapy in, 38
——, Organotherapy of, 39
——, Pathology of, 119
——, Prevention of, in Belgian children, 97
——, —— ——, —— childhood, 49
——, Pulmonary, among Arabs, 87
——, ——, Amputation of arm and, 114
——, ——, Anatomical development of, 135
——, ——, and glomerulonephritis, 72
——, ——, —— heart, 70
——, ——, —— insulin, Diabetes, 73
——, ——, —— ossification of costal cartilages, 137
——, ——, —— pulmonary syphilis, Combined, 79, 80
Tuberculosis, Pulmonary, Cachexia as activator of, 114
——, ——, chronic mixed infection in, Treatment of, with "Omnadin," 2
——, ——, Coexisting syphilitic laryngitis and, 79
——, ——, dyspepsia in, Treatment of, 72
——, ——, Fatty liver in, 72
——, ——, Gastric disturbances and, 71
——, ——, —— ulcer and, 71
——, ——, Goitre and, 50
——, ——, Haemolytic jaundice complicating, 72
——, ——, —— streptococci in, 52
——, ——, Ipecopan as expectorant in, 34
——, ——, Lipasotherapy in, 37
——, ——, Lymphocytosis and, 41
——, ——, Mediastinal deviations in, 131
——, ——, Mitral stenosis and, 71
——, ——, Pathology of, 129
——, ——, Pregnancy and, 111, 112
——, ——, Prognosis of, 39
——, ——, reinfection in, Origin of, 114
——, ——, Relation between upper respiratory tract and, 113
——, ——, Surgical operations and, 114
——, ——, treatment of, Camphor in, 36
——, ——, —— ——, Historical note on, 82
——, ——, —— ——, Surgical, 2, 3, 4
——, ——, —— ——, ——, Complications in, 3
——, ——, —— ——, ——, Operations in, 4
——, ——, —— ——, ——, X-rays in, 5
——, ——, —— ——, with artificial pneumothorax, 6
——, ——, —— ——, —— "aurophos," 31
——, ——, —— ——, —— autogenous vaccines, 1
——, ——, —— ——, —— calcium, 35
——, ——, —— ——, —— dilaudid, 38
——, ——, —— ——, —— gold, 31
——, ——, —— ——, —— helpin, 36
——, ——, —— ——, —— insulin, 38
——, ——, —— ——, —— iodine, 35
——, ——, —— ——, —— lipatren, 36
——, ——, —— ——, —— living virulent tubercle bacilli, 2
——, ——, —— ——, —— Sanocrysin, 32, 33

Tuberculosis, Pulmonary, treatment of with sulphates of ceric earths, 34
——, ——, —— ——, —— thoracoplasty, 23
——, ——, —— ——, X-ray, 30
——, ——, Triphal in, 31
——, renal, and tumors of bladder, Diagnosis between, 78
——, Research in, 83, 84
——, Silicosis and, in coal miners, 69
——, —— ——, —— granite workers, 68
——, surgical, Heliotherapy in, 26
——, ——, in children, Red-cell sedimentation in, 126
——, ——, Treatment of, with Krysolgan and triphal, 31
——, Suspecting, 83
——, Tissue metabolism in, 144
——, Transient contract and, 109
——, Treatment of, with colloidal antimony, 34
——, —— ——, —— lipatren, 36
——, —— ——, —— vaccines of atypical tubercle bacilli, 2
——, —— ——, X-ray, Experimental, 30
——, Tumors and, 73
——, urochromogen and red-cell sedimentation reactions and leucocytes in, Prognostic value of, 41
Tuberculous and nontuberculous pulmonary disease in childhood, 118
—— cervical adenitis in infancy, X-ray diagnosis of, 116
—— children, Blood monocytes in, 120
—— excreta, Disinfection of, 50
—— infection in childhood, Evolution of, 118
—— ——, Route of, 108, 109
—— lobitis in children, 122
—— peritonitis, Treatment of, 126
—— teacher, Exposure of children to, 128
—— women, Parturition in, 53
Tumor, pleuropulmonary, in child, Diagnosis of, 78
Tumors and tuberculosis, 73
——, Intrathoracic, 74
——, ——, Diagnosis of, 75
——, ——, Surgery of, 74
—— of bladder, Diagnosis between renal tuberculosis and, 78
Tumors and lungs, primary, X-ray aspects of, 77
Turpin and Weill-Halle, B. Immunization with BCG vaccine, 48
Turpin, R., and Sergent, E. Constitutional factor and tuberculosis, 110

Ukraine, Tuberculosis mortality in, 90
Ulcer, Gastric, and pulmonary tuberculosis, 71
Ulcers of bladder, Nonspecific, following tuberculosis, 53
Ultraviolet light, Sources of, for heliotherapy, 27
—— ——, Treatment of ocular disease with, 29
—— radiations of sun, Transmissibility of, 28
—— rays, 27
—— ——, Antirachitic activity of, 29
—— ——, Filtration of, 29
—— —— in treatment of children, 127
Upper respiratory tract and pulmonary tuberculosis, Relation between, 113
Urochromogen and red-cell sedimentation reactions and leucocytes in tuberculosis, Prognostic value of, 41

Vaccine, BCG, Experimental studies on, 48
——, ——, Immunization with, 48
——, Calmette's, Reliability of, 104
——, oleo-, Experiments with, 1
Vaccines, autogenous, Treatment of pulmonary tuberculosis with, 1
—— of atypical tubercle bacilli, Treatment of tuberculosis with, 2
——, Vaudremer's, Treatment of tuberculosis of skin with, 1
Value of artificial pneumothorax, 8
Van Campenhout, E. Sanitary situation in Belgian Congo, 99
Van Leuwen, W. S. Asthma and tuberculosis, 54
Variations in hilum tuberculosis, Seasonal, 133
Vaudremer, A., Puthomme, E., and Paulin, J. Treatment of tuberculosis with vaccines of atypical tubercle bacilli, 2
Vaudremer's vaccines, Treatment of tuberculosis of skin with, 1

Veber, T. Tubercle bacilli in pleural exudates of artificial pneumothorax, 18
Villaret, Bezançon and Imbert. Treatment of pulmonary tuberculosis with sanocrysin, 32
Vincent, H. Pulmonary gangrene, 62, 63
Virulence of "BCG," 104
Virulent tubercle bacilli, living, Treatment of pulmonary tuberculosis with, 2
Vital capacity, 142
Vonessen. Tuberculin tests in schools, 117

Wagner, H. Seasonal variations in hilum tuberculosis, 133
Wahncau, E. Diagnosis of hilum tuberculosis in childhood, 123
Waldenström, H. Origin and disappearance of amyloid, 139
Walker, Jane. Flaws in antituberculosis administration in England, 102
Walser, A. Spontaneous pneumothorax following unsuccessful attempts at artificial pneumothorax, 18
Ward, E. So called minor tuberculosis, 82
Warsaw, Tuberculosis of infants and children in, 115
Warwick, M., and Christison, J. T. Actinomycosis of lungs, 65
Wasson, W. W. Hilum of lung, 131
Watkins-Pitchford, W. Silicosis among South African gold miners, 67
Weicksel, J. Lymphocytosis and pulmonary tuberculosis, 41
Weiller, P., and v. Muralt, F. L. Camphor in treatment of pulmonary tuberculosis, 36
Weill-Hallé, B. Subcutaneous protective inoculation with BCG, 103, 104
——, ——., and Turpin. Immunization with BCG vaccine, 48
Weiss, C. Proteases of pleural exudates, 141
Whittemore, W. Treatment of chronic bronchiectasis, 61
——, ——. Treatment of pulmonary tuberculosis with thoracoplasty, 23
Wigand, R., and Heitz, E. Functional test for reticulo-endothelial system, 134
Williams, E. G. C. Perthes' disease, 53
Wilmer, H. B. Treatment of asthma, 58
Wimberger, H. Tuberculous and nontuberculous pulmonary disease in childhood, 118
Winds, Rain-bearing, and early phthisis, 111
Winkelbauer, A., and Frisch, A. V. Gastric ulcer and pulmonary tuberculosis, 71
Wischnowitzer, L. Fibrin bodies in pneumothorax space, 139
Wolf, J., and Rosenberg, M. Diabetes, pulmonary tuberculosis and insulin, 73
Wolf, J. E. Roentgenography of healing of cavities, 138
Women, tuberculous, Parturition in, 53
——, ——, Tuberculosis among, 87
Work of Belgian Antituberculosis League, 95
Wyman, E. T. Ultraviolet rays in treatment of children, 127

X-ray aspects of cancer of lung, 78
—— —— —— primary tumors of lungs, 77
—— diagnosis of abdominal tuberculosis in children with pneumoperitoneum, 125
—— —— —— asthma, 57
—— —— —— tuberculous cervical adenitis in infancy, 116
—— treatment of pulmonary tuberculosis, 30
—— —— —— tuberculosis, Experimental, 30
X-rays in surgical treatment of pulmonary tuberculosis, 5

Young school children, tuberculosis in, 117
—— women, Tuberculosis among, 87

Zadek, I., and Meyer, M. Protective inoculation of children with dead tubercle bacilli, 49
Zawadowski and Chaumet. Pulmonary tuberculosis and ossification of costal cartilages, 137
Zimmermann, R. Course of severe childhood tuberculosis, 119
Zinn, W. Treatment of pulmonary tuberculosis with sanocrysin, 33

DEC 10 1928

INDEX NUMBER

THIS NUMBER COMPLETES VOLUME XVIII

Vol. XVIII DECEMBER, 1928 No. 6

Medical Libr

THE AMERICAN REVIEW OF TUBERCULOSIS

EDITOR

ALLEN K. KRAUSE, Baltimore, Md.

EDITORIAL STAFF

J. BURNS AMBERSON, JR., Loomis, N. Y.
E. R. BALDWIN, Saranac Lake, N. Y.
LAWRASON BROWN, Saranac Lake, N. Y.
H. J. CORPER, Denver, Col.
H. R. M. LANDIS, Philadelphia, Pa.
PAUL A. LEWIS, Princeton, N. J.
HENRY SEWALL, Denver, Col.

PUBLISHED MONTHLY

at Mount Royal and Guilford Avenues, Baltimore, Md.

By the

National Tuberculosis Association, Business Office, 370 Seventh Avenue, New York City

Save from 10% to 40% on "Lysol" purchases

DURING the past two years a great many hospitals have taken advantage of our "Yearly Purchase Plan."

This enables you to contract in advance for your year's supply of "Lysol" Disinfectant, taking delivery at the time and in the quantity you prefer, and paying as deliveries are made.

The saving under this plan amounts to from 10% to 40% under our regular prices, depending on the total amount ordered!

Is there any sound reason for using an inferior disinfectant? "Lysol" Disinfectant, controlled and tested by the chemist-specialists in our laboratories, is absolutely uniform, completely soluble and neutral.

Do not expose your staff and patients to danger, and jeopardize the standing of your institution by using an inferior disinfectant.

Send the coupon below. Full details of our new money-saving plan will be mailed to you.

Lysol Incorporated

Reg. U.S. Pat. Off.

Lehn & Fink Radio Program—WJZ and 15 other stations associated with the National Broadcasting Co.—every Thursday evening at 8, eastern time; 7 P.M. central time.

Sole distributors Lehn & Fink, Inc., Bloomfield, N. J.

LEHN & FINK, Inc., *Sole Distributors*, Dept. H-53, Bloomfield, N. J.

Send us your NEW offer for supplying "Lysol" Disinfectant.

Name of Hospital_____ No. of Beds_____

Street_____

City_____ State_____

Name of Buyer_____ Title_____

Entered as second-class matter March 9, 1917, at the postoffice at Baltimore, Md., under the Act of August 24, 1912. Acceptance for mailing at a special rate of postage provided for in section 1104, Act of October 3, 1917. Authorized on July 2, 1918.

Copyright 1928, by The National Tuberculosis Association

1927 Transactions

Now Ready for Distribution

The report of the 23d annual meeting of the National Tuberculosis Association, held in Indianapolis, Ind., in May, 1927 has recently been published.

This volume contains in full or in abstract form all the papers presented at the meeting.

Price $3.00, postpaid

NATIONAL TUBERCULOSIS ASSOCIATION
370 Seventh Avenue, New York

TUBERCULOSIS SANATORIUM DIRECTORY

1928 Edition

An up-to-date compendium of information about sanatoria, hospitals, day camps, preventoria and other tuberculosis institutions. Includes date of establishment, bed capacity, character of patients received, rates, method of application, name of medical director or other person in charge; also, wherever necessary, information as to the easiest way to reach the sanatorium.

Cloth; approximately 130 pp.; $1.00, postpaid.

TUBERCULOSIS ASSOCIATION DIRECTORY

1928 Edition

Lists 1,454 organized state and local associations in addition to special committees that assist in the Christmas seal sale and other phases of the yearly program.

Every state in the Union has an active state tuberculosis association affiliated with the National Association. In turn, county and municipal associations are affiliated with these. Directing the activities of these bodies, is the National Tuberculosis Association. The number of state and local associations that employ paid executives is 358, contrasted with about 25 in 1908.

Paper; approximately 85 pp.; 50c., postpaid.

THE NATIONAL TUBERCULOSIS ASSOCIATION
370 Seventh Avenue, New York

Remember!

CALCREOSE offers the full expectorant action of creosote in a form agreeable to the patient.

Each 4 gr. tablet contains 2 grs. of creosote combined with calcium hydroxide.

when treating stubborn coughs you have available

Calcreose

Meeting the demand for a cough syrup containing *Calcreose* is the new COMPOUND SYRUP OF CALCREOSE ... a tasty, effective remedy for minor respiratory affections.

Each fluid ounce represents Calcreose Solution, 160 minims (equivalent to 10 minims of pure creosote); Alcohol, 24 minims; Chloroform, approximately 3 minims; Wild Cherry Bark, 20 grains; Peppermint, Aromatics and Syrup q.s. *Samples of Tablets and Syrup to Physicians on Request.*

MALTBIE CHEMICAL COMPANY
NEWARK, N.J.

Two important thoughts . . *on ultra violet light-therapy*

WHICH LAMP TO CONSIDER . . . *and* WHAT TO READ

THE first consideration in the purchase of an ultra violet lamp is the production solely of ultra violet rays in quality and quantity—efficient enough to carry on the proper therapeutic procedure. The HANOVIA Quartz Lamps, the ALPINE SUN and KROMAYER do just these things. They were the originators of the use of ultra violet therapy in this country, and with them the present standard technique has in the most part been based and the clinical results founded.

The question of literature on the subject is an important one, and the material is voluminous. We suggest the reading of the current work on the use of ultra violet light for diagnosis. With the use of the quartz lamp and the proper filters, the fluorescent properties of the ultra violet light on the skin react differently according to the nature of the disease. Though known about for sometime, only recently have active reports of this work been published. Mail in the attached coupon for this data.

Pertinent Facts About the Entire Quartz Mercury Anode Type Burner

1. Stability of the arc
2. Does not generate excessive heat
3. No fumes or smoke
4. Requires no adjustments
5. Operates without attention
6. Low cost for operation
7. Technique easily standardized
8. No danger from sparks
9. Maximum treatment at minimum cost
10. Saves time

Divisional Branch Offices

Atlanta, Georgia—Medical Arts Bldg.

Chicago, Illinois—30 North Michigan Ave.

New York, New York—30 Church Street

San Francisco, California—220 Phelan Bldg.

The *ALPINE SUN* LAMP

HANOVIA CHEMICAL & MANUFACTURING CO. Dept. 35. Newark, New Jersey

Please furnish me, without obligation, reprints of your authoritative papers upon the use of quartz light in the treatment of

_____

Dr. _____

Street _____ City _____ State _____